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Syme Memorial Lecture.[1]

SYME AND MEDICAL EDUCATION.

By B. T. ZWAR, M.D., M.S. (Melbourne), F.R.A.C.S.,
Melbourne.

A LITTLE more than ten years ago, on November 24, 1924, as Dean of the Clinical School of the Melbourne Hospital, I was privileged to speak at the unveiling of the portrait of Sir George Syme which now adorns this hall. I then expressed the hope that provision would be made so that future generations of medical students and members of the medical profession could receive a word picture of the ideals and of the influences upon medical education of the man who had been portrayed so well by Sir John Longstaff. I little thought that within so short a time it would fall to my lot to contribute something in compliance with such a provision. I am deeply sensible of this honour and to the Council of the Victorian Branch of the British Medical Association I express my grateful appreciation for inviting me to deliver the second Syme Memorial Lecture. The first George Adlington Syme lecture was delivered by the late Frederick Dougan Bird on February 23, 1928, and has been aptly described as "pregnant with wisdom and replete with lessons for those of a younger generation". The first Syme Memorial Lecture, delivered by Dr. Leo Kenny on November 26, 1931, was a wonderful word picture which portrayed Syme and his varied and manifold achievements and his influences from his boyhood to his passing.

I have not found it difficult to select as a theme for this second memorial lecture an achievement

[1] Delivered at a meeting of the Victorian Branch of the British Medical Association on April 11, 1935.

from what Dryden would have called this "God's plenty". My theme is Syme and medical education. For more than forty years Syme rendered medical education great and manifold services and bestowed upon it many benefits. With an almost impassioned enthusiasm he was always ready to contribute something towards the solution of its problems. Much of the work and influence of his life was for an ever higher standard of medical service. Towards the evening of his life it was my privilege to hear from him many of his hopes regarding the selection and the training of future members of our profession. Many may remember a stirring appeal regarding the ideals and traditions of our profession made to members of the Federal Council of the British Medical Association in Australia and of the Council of this Branch at a dinner some ten days before the commencement of his short fatal illness. Tonight, then, may we honour his memory and at the same time do a service to the subject so dear to him by a review of his influences and by an application of his teaching to conditions which obtain today.

On the Necessity for Frequent Review of Methods of Medical Education.

Syme, very early, fully realized that methods of medical education called for frequent review and adjustment.

Syme graduated in 1881. From the end of 1883 to 1887 he was engaged in post-graduate studies in England. In 1889, in *The Australian Medical Journal*, we find him sharing the responsibility for the following statement on medical education:

> That existing systems are more or less unsatisfactory is largely due to the fact that medical education is in a state of transition. So long as medical science continues its present rapid evolution, so long will frequent changes in our methods of medical education be necessary. It would be as hopeless as absurd to think of planning now a curriculum that should be final and perfect. It is high time, however, to get rid of many of the traditions of the past, both as regards subject matter and methods.(1)

Pre-Medical Education and Selection of Students in Medicine.

Syme firmly held and on appropriate occasions expressed the conviction that candidates accepted for the medical profession should possess certain qualities in addition to those necessary for the passing of the required examinations. He was of opinion that the practice of medicine and of surgery in any of its branches required special qualities of temperament, mental ability and social instinct, qualities which go to make the character and the personality of the candidate. It was his conviction that if the high traditions and ideals of the medical profession were to be maintained, then more importance would have to be placed on such qualities. He considered it a fundamental error that in the absence of definite aptitude and qualifications the choice of the medical profession as a career should be left to parents or guardians, who frequently were ignorant as to the qualifications required or were unable to assess them. Too often in such circumstances the medical profession was selected merely as a means of earning money and was lowered to the level of a trade. The matter of insuring that none enters the portals of the profession unless he or she be prepared to recognize the traditions and ideals and to contribute to its honour and dignity is, however, no easy matter.

Our American fellow workers in the field of medical education have given a great deal of thought to this particular problem. The Commission on Medical Education, working under the auspices of the Association of American Medical Colleges,(2) expressed the opinion that in the selection of students for the medical profession such qualities as character, personality, environment, leadership and general culture are more important than scholastic records. Most of the American universities which conduct medical schools now possess a personnel which forms a liaison between the university and colleges or schools from which the medical students are drawn. This personnel has an advisory function in regard to the colleges or schools and a selective one in regard to the university.

Most medical schools of the Empire do not exercise such selective powers. Nevertheless, some power of rejection on other than scholastic grounds seems desirable, and the creation of a body endowed with such powers and which forms a liaison between the premedical schools and the university is well worthy of consideration. In this connexion it must be recognized that there is much truth in Edward Lyttleton's contention that home training is the "corner-stone" of education and that "the practice of certain principles in the home makes for the growth of a certain kind of character in the children, in the direction either of virtue or selfishness, of service or isolation, of weal or woe".(3) Lastly, it is important that in the minimal requirements for premedical education there should be greater insistence on literary, artistic, philosophic and historical qualifications, especially in view of the fact that the medical curriculum is overloaded with training of an exclusive type.

The Place of the Elementary Sciences in the Scheme of Medical Education.

Two problems have been the subjects of much thought and debate, namely: (i) how to provide for a wider cultural premedical education, and (ii) how best to achieve a lightening of the medical curriculum. In 1889 Syme addressed himself to these problems as follows:

> Year after year new subjects have been added to the curriculum . . . . The time occupied by the course, however, has not been extended, old subjects have not been dropped, the didactic lectures continue, the burden of examinations increases in proportion, and the only way the average student sees out of his trouble is cram or the help of the professional grinder . . . . One fact, therefore, becomes very clear . . . the course must be lengthened. It has been suggested that this lengthening might be partly indirect, by making natural philosophy and inorganic chemistry compulsory subjects at matriculation for medical students and raising the standard of examination in these subjects. In this way room could be made for anatomy as a first year subject.(4)

In a subsequent article Syme again referred to this suggestion, but he did not advocate it at the expense of premedical cultural education.

These problems still call for a solution. It is as far back as 1881, at the International Medical Congress in London, that Professor Thomas H. Huxley spoke as follows:

> Somehow or other the curriculum must be lightened .... The question is how this can be done. My own belief is that if the Medical Council were to insist upon a knowledge of elementary physics, chemistry and biology in a two years' course prior to entrance to the medical schools, they would be taking one of the greatest steps which at present can be made for the improvement of medical education.[5]

It is recognized that since then great advances have been made in the teaching of these subjects in the medical schools and that the importance of the intimate relationship between them and medicine and surgery is far greater than was at that time realized. The progress in medicine and in surgery has shown how indissolubly it is connected with the advances in pure scientific knowledge and how the teaching of medicine and of surgery must be based largely on the fundamental facts and theories of physics, chemistry and biology.

In England for many years a great number of educationists were of opinion that the secondary schools were not sufficiently equipped to teach these subjects satisfactorily. Other authorities, no less eminent, and including Sir James Paget, claimed that these schools should be so equipped as to allow this to be done. It was not until 1911, however, that the General Medical Council agreed to recognize the teaching in preliminary science in approved schools as qualifying for the first professional examination in medicine. This recognition was embodied in the following resolution (May 29, 1911) of the General Medical Council:

> That it be an instruction to the Students' Registration Committee that when a secondary school has been inspected and recognized by a licensing body, and has applied to be placed on the list of approved institutions in which medical study may be commenced, the Students' Registration Committee shall consider every such application, and when satisfied that the education in such secondary school is of sufficient standard, shall recommend such secondary school to be placed by the Council upon the list of institutions in which such medical study may be commenced.[6]

The Royal Commission on University Education in London, which presented its final report in 1913, expressed the conclusion:

> That the study of the preliminary sciences should not be included in the medical curriculum; that the undergraduates should not be admitted to the Faculty of Medicine in the University until they have received thorough instruction in the principles of pure science; and that, whenever it is possible, the best time and place for this instruction is the last two years of a good secondary school course.[7]

In 1922 the General Medical Council agreed that, first, the elements of chemistry, physics and biology should be taught in the secondary or public school before the student is registered and that he should pass an examination in them before he enters on his course at the university; and, secondly, that in the medical school he should be taught the applications of science to medicine, and that such teaching of applied science should be continued throughout the medical curriculum.

As already indicated, the transference of these preliminary sciences from the curriculum to the premedical period of education in the schools has been criticized adversely on the grounds of: (i) inadequacy of equipment and absence of expert staff in many of the public and secondary schools; (ii) inability or difficulty in public and secondary schools of the teacher in biology undertaking research work and keeping in touch with the medical course or advances in medicine; (iii) the absence of a university atmosphere and of university methods of teaching.

On these grounds no less an authority than Professor Sir Ernest Rutherford has opposed the transference. On the other hand, proper equipment and staffing of the schools in question for the teaching of these subjects will be a great asset to education generally and of much benefit to students preparing for entrance to any profession. It must be emphasized also that whilst receiving instructions in these science subjects a part of the pupil's time should be reserved for the study of other cultural subjects. In other words, the teaching of science should not be to the exclusion of nor should it be divorced from literary, historical and other cultural studies.

The problem, how to deal best with the elementary sciences in the scheme of medical education, is one which calls for consideration by our university and by our public and secondary schools. As a result of inquiries one feels that the schools are prepared to play their part in its solution, though it is realized that biology presents the most difficult problem. If it is true, as has been contended, that those entrusted with the teaching of the science subjects in the schools are not sufficiently expert, one would reply with the late Viscount Haldane's advice: "Let our universities concentrate on the production of finer teachers."[8] If, then, all premedical schools were placed in a position to attract the right type of teachers and to provide the necessary up-to-date equipment, it might be possible to lighten the burden of the medical curriculum and at the same time greatly benefit education in general.

Satisfactory arrangements in the directions indicated would of necessity require the raising of the age for commencing the medical course at the university beyond that of seventeen years, which obtains at present. The Committee on Medical Education of the British Medical Association, which issued its report less than a year ago, dealt with this point.[9] Its recommendation was based on the assumption that the registration as medical students would be at the time when the study of human anatomy and physiology systematically began, and that before registration the student would be required to show "a somewhat higher degree of general education than the minimum now required, and also a sufficient knowledge of physics, chemistry, and of the general principles of biology". With this assumption it was stated that:

Representatives of the teaching profession consulted by the Committee were unanimously of opinion that it would be advantageous definitely to prescribe the age of eighteen years as that below which registration as a medical student should not be allowed.

We next come to Syme's attitude to medical education as governed by the medical curriculum in the University of Melbourne. He repeatedly addressed himself to what may be considered guiding principles in the training of medical students. In one of his last public utterances on this subject—in the presidential address at the First Session of the Australasian Medical Congress (British Medical Association), delivered on November 12, 1923—he summed up his attitude in the following words:

> The only criticism that may be offered is that tradition has still too much influence and that the dead hand of the past holds too much power. Some of the knowledge still demanded might be abolished to make room for new subjects of greater importance.[130]

This plea for a pruning of the curriculum to compensate for the continual grafting on to it he had repeated over and over again since he first submitted it in 1889. He protested against the recurring addition of new subjects without any attempt to remit such subjects or such parts as had become comparatively obsolete, and against the amount of time spent in the giving of systematic lectures. Let us recall his words:

> A desirable change would be to make attendance on all didactic lectures optional .... If the lectures proved to be of assistance, students would attend them, while the lecturers would be stimulated to make the teaching interesting. Systematic lectures in *materia medica* might well be abolished.[131]

But notwithstanding attempts and promises to prune and to rid the curriculum of such subjects or parts of subjects which might well be dispensed with, the grafting on to it of all types of special subjects has been continued in an amazing manner. Some lectures have been reduced, but they are still considered of paramount importance in most subjects. The fact has been lost sight of that systematic lectures are really a survival of the days when good text books did not exist. Nowadays their objective and usefulness should consist in aiming: (i) to give students a proper perspective of the subject from the viewpoint of general practice; (ii) to bring the knowledge in text books up to date; and (iii) to vitalize the subject by illustrations from personal experience or by demonstrations. And as with systematic lectures, so also with the matter for and the manner of clinical teaching and of examining. All these should aim at the creation of a medical graduate properly fitted for the work of general medical practice. They should avoid the creation of a graduate poorly, and therefore dangerously, equipped for manifold specialties. In this connexion the importance of the influence of lecturers, clinical teachers and examiners cannot be too greatly stressed, particularly in the latter part of the medical curriculum. It is within the power they may exercise to direct students on sound or unsound lines.

Nearly fifty years ago Syme considered that systematic lectures in *materia medica* might well be abolished. It was not the only part of the curriculum to which he desired the pruning knife to be applied in order to allow for some useful additions. Since that time, that is, for nearly half a century, though repeated requests and promises have been made to delete from our medical curriculum that which is too obsolete or unnecessary, nothing but additions of new subjects and additions to old ones have been made. It is not contended that these additions were not desirable, but, as Syme has stated: "Some of the knowledge still demanded might be abolished to make room for new subjects of greater importance", and, may I add, allow our students some time to think for themselves.

The position of *materia medica* is worthy of closer consideration. In 1889 Syme expressed the view "that systematic lectures in *materia medica* might well be abolished". The following statement shows how, notwithstanding, this subject has been allowed to grow.

In 1889 the Melbourne University Calendar made the following recommendations for *materia medica*, medical botany and elementary therapeutics:	The Melbourne University Calendar for 1934 gives the following details in regard to *materia medica* and pharmacy:
The natural history, preparation, doses and actions of all the medicines officinal in the British Pharmacopœia. The most important non-officinal drugs. The characters of the more important orders of medicinal plants. The chief adulterations of drugs. Incompatibilities. The art of prescribing medicines.	(a) The general nature and composition, together with the outstanding physical and chemical characters of the more important Pharmacopœial substances, and of selected unofficial drugs in common use. (b) The composition of the official preparations of these drugs, and the processes employed in their manufacture. (c) The doses of these drugs and of their preparations in terms of the Metric system. (d) Weights and measures of the Metric system and their equivalences in the Imperial system. (e) Prescription writing, with and without abbreviations. (f) Chemical and pharmaceutical incompatibilities. (g) Recognition of a few of the more important drugs and galenicals. (h) Practical dispensing of the various types of prescription.

For no purpose other than to illustrate the growth of a subject and the increasing burden of the medical curriculum, let us glance at the development of bacteriology. (The purpose differs from that for showing the previous statement.)

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We come next to the additions of new and special subjects, such as ophthalmology, radiology, orthopædics, psychology *et cetera*. Each one of these subjects may be made into a full-time study. In that admirable memorandum on "Recent Advances in Medical Education in England", addressed to the Minister of Health, Sir George Newman laid down conditions which should govern the study of special subjects, namely:

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2. No attempt should be made, within the minimum medical curriculum, to do more than handle the elements of the special subject, competence in which is necessary to the general practitioner; and, lastly, the special subject should be taught, not as something *ad hoc*, separate, but as an intrinsic part of the whole of medicine.

In a personal communication to me, Professor Wilkie, of the Department of Surgery in the University of Edinburgh, writes:

I am in entire agreement with you that the tendency of late has been to teach the student too much, particularly methods which can be practised only by the specialist. The tendency in Edinburgh is to endeavour to simplify the course; to teach the student and to expect of him a knowledge of only those methods, both diagnostic and operative, which pertain to general practice.

In answer to criticisms, such as have been advanced, it is frequently stated that the General Medical Council, which governs the medical curriculum, is responsible for any overloading which has occurred. This is quite a wrong conception of the function of the General Medical Council. This body was established in order "that persons requiring medical aid should be able to distinguish qualified from unqualified practitioners". The General Medical Council

has no power to make rules in regard to the medical curriculum or examinations, but it can pass resolutions and make recommendations relating thereto, and if any of these were ignored by the licensing bodies, it would be open to the Council to make representations to the Privy Council, which, if it thought fit, might order that the qualifications obtained from such bodies should not be registrable.

One of the General Medical Council's criticisms of medical curricula of today has been that they aim to provide instruction in too many subjects in too great detail. In the presidential address of the General Medical Council in 1933, Sir Norman Walker said:

We should not forget, when considering proposals for making new grafts on the curriculum, that one of the most useful of the gardener's implements is the pruning knife.

The Importance of Clinical Study.

Throughout his professional career Syme stressed the importance of clinical study and clinical experience in the training of medical students and graduates. Listen to him:

The knowledge acquired by clinical study is always solid and permanent. Theories as to causation, nature and treatment of disease change, means of investigation are improved, new interpretations given of old symptoms and signs; but the symptoms and signs themselves never alter. The clinical descriptions by Hippocrates are as true today as when they were written.

Further, the methodical investigation of patients, if properly conducted in a clinical school adequately equipped with laboratories, is as truly scientific, being a rigorous observation of facts, as any other part of the curriculum. Clinical work is the crown of the whole system.[13]

Though this was said more than twenty years ago, it so admirably describes the proper position of clinical study in any system of medical education today that it is not desired to add another word.

Importance of Medical Research.

Here one may appropriately refer to Syme's attitude to medical research, which has often been misunderstood and at times misstated. None realized more fully than Syme that research was an important and essential function of a university and of a medical school, but he pointed out that:

Those who possess capacity to deal with unsettled problems, who have scientific imagination and independence of mind, are, like poets, born, not made, and are unfortunately limited in number. Our methods of teaching, and especially of examination, should be such as will encourage and not cramp originality, but they cannot create it.[13]

With a definite purpose I have given the closest association to Syme's views on clinical work and medical research. It is well known that Sir James Mackenzie laid the foundation for his discoveries by the clinical work in a large general practice. It was the clinical experience thus gained which led him to develop technical help by the aid of his researches. In the Harveian Oration of 1933 Sir Thomas Lewis stresses the need for the integration of laboratory research with careful and repeated clinical observation, and expresses the opinion that such integration is essential to the vitality of medical research.

Whilst Syme was fully alive to the value of research, he was also aware that with some the term research has become a mere fetish, and that its real meaning was not properly appreciated; he recognized that many students and graduates did not possess an aptitude for research, properly so called. Surely it is useless, it may even be harmful, to force such students or graduates to carry out investigational work at the expense of a more thorough training. On the other hand, there are students and graduates who, by inclination and aptitude, are more fitted for research work than for the ordinary practice of their profession. Clinical medicine and clinical surgery, as well as the community, may

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Though this was said more than twenty years ago, it so admirably describes the proper position of clinical study in any system of medical education today that it is not desired to add another word.

Importance of Medical Research.

Here one may appropriately refer to Syme's attitude to medical research, which has often been misunderstood and at times misstated. None realized more fully than Syme that research was an important and essential function of a university and of a medical school, but he pointed out that:

Those who possess capacity to deal with unsettled problems, who have scientific imagination and independence of mind, are, like poets, born, not made, and are unfortunately limited in number. Our methods of teaching, and especially of examination, should be such as will encourage and not cramp originality, but they cannot create it.[12]

With a definite purpose I have given the closest association to Syme's views on clinical work and medical research. It is well known that Sir James Mackenzie laid the foundation for his discoveries by the clinical work in a large general practice. It was the clinical experience thus gained which led him to develop technical help by the aid of his researches. In the Harveian Oration of 1933 Sir Thomas Lewis stresses the need for the integration of laboratory research with careful and repeated clinical observation, and expresses the opinion that such integration is essential to the vitality of medical research.

Whilst Syme was fully alive to the value of research, he was also aware that with some the term research has become a mere fetish, and that its real meaning was not properly appreciated; he recognized that many students and graduates did not possess an aptitude for research, properly so called. Surely it is useless, it may even be harmful, to force such students or graduates to carry out investigational work at the expense of a more thorough training. On the other hand, there are students and graduates who, by inclination and aptitude, are more fitted for research work than for the ordinary practice of their profession. Clinical medicine and clinical surgery, as well as the community, may

suffer a great deal by a wrong direction of those fitted only for one of these two fields. Syme's attitude in regard to research was based on a full appreciation of its value and on a desire to have it so directed that its results might be worthy of its name. Above all he recognized that it was of the greatest importance to train students undergoing their medical education in proper methods and to cultivate in them a spirit of research; and that students and investigators must be taught to realize that in order to advance or extend the frontiers of a subject the possession of a sound knowledge of that subject within its present limits was one of the first essentials.

On the Need for Organized Post-Graduate Teaching.

As long ago as 1890 Syme expressed himself in favour of organized post-graduate teaching in the following words:

> Clinical material exists in abundance for post-graduate courses in several subjects. Would graduates avail themselves of the opportunities it afforded? We think it would be well worth trying, and gynæcology, pædiatrics and laryngology would probably be the most attractive subjects with which to start. We recommend the question to the earnest consideration of the senior members of the profession, who have made a special study of these branches and hold hospital appointments affording clinical material.[(a)]

In 1905 he again stressed the importance of post-graduate training and discoursed on the methods of carrying it out in the following confession:

> I was foolish enough, when just graduated, to take a position as *locum tenens* for a practitioner who had been suddenly taken ill. He had a very large general practice, with numerous lodges. My experiences were . . . extremely disheartening. I was satisfied that, in spite of my legal status, I was not qualified to practise, nor did I attempt to do so till I had done six years' additional work, holding various subordinate hospital appointments, in which I could acquire practical knowledge, technical skill and a feeling of confidence. It seems to me a question for very serious consideration whether practitioners should be registered unless they can show evidence of practical work, either as a resident medical officer, or pupil at a hospital, or as assistant to a medical man in practice subsequent to the taking of a diploma.[(a)]

In the fullest possible manner did Syme realize that, in addition to such organized training, every medical practitioner must continue to be a student throughout his or her professional life. By that means only could the responsibilities to patients and the community be fulfilled. All who knew Syme will remember how conscientiously he carried out this task and how he continued to do so even after he had retired from active practice. He was, moreover, ever ready to provide opportunities for and assist in the post-graduate education of the medical profession. No one realized more fully the importance of such education for the establishment and maintenance of an efficient medical service for the community. The part he played in the founding of the College of Surgeons of Australasia (now the Royal Australasian College of Surgeons) is abiding evidence of this.

In the field which I have covered in this lecture I have no doubt traversed much old ground, but, in the words of Sir Norman Walker in his presidential address to the General Medical Council:

> Medical education and its bearing on the public weal is today the subject of anxious consideration in every civilized country . . . . The boundaries of medicine are ever extending, and there is more and more to be learned. The Council welcomes all the inquiries which are going on as likely to contribute to the solution of a difficult problem.

In concluding this part of my lecture it is best to quote to you again from Syme's published pronouncement already referred to, namely:

> So long as medical science continues its present rapid evolution, so long will frequent changes in our medical education be necessary.

In other words, any effective system of medical education must exhibit vital activity, growth and continuous development and improvement. Such development and improvement require the constant watchfulness and consideration of a permanent body—a medical curriculum committee (a sub-committee of the Faculty of Medicine)—so constituted as to be able to bring about, through the Faculty of Medicine, such additions to and remissions from the curriculum as the evolution of medical science may demand. Such body should have the further duty of advising the Faculty of Medicine on such questions as the method of selection of medical students, improvements in pre-medical education or other matters relating to medical education as these arise.

To us who have gathered here tonight to do honour to the memory of George Adlington Syme, it will be of interest to know how great was his influence on medical education and how widely it was appreciated.

In a personal note from Dr. William J. Mayo, of the Mayo Foundation, Rochester, dated August 14, 1934, Dr. Mayo writes:

> My brother and I and our colleagues in the clinic recall with a great deal of pleasure Mr. Syme's visit here not long after the Great War. Intensely concerned with all pertaining to medicine and surgery, he was an inspiration to all members of the staff, and perhaps especially to the graduate students of the Mayo Foundation for Medical Education and Research, for he was then, as afterward, particularly interested in graduate medical instruction. In his death the profession he loved so well sustained a great loss.

And Professor Harvey Cushing, now of the Yale University, writes under date of August 1, 1934:

> I remember him [Syme] as a charming gentleman and delightful visitor. There is no question at all that his habit of periodically visiting other clinics is a most important and valuable practice for all surgeons.

And with this note of appreciation sounded by two of the most world-famed authorities in the field of surgery I will close.

It has been my endeavour to present to you some of the ideals of the man this lecture is intended to memorialize. As heirs of those ideals, let us remain mindful of the gifts he has bestowed upon our profession by his wisdom, his influence and his devotion.

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COMMENTS ON POST-OPERATIVE PNEUMONIA.

By K. W. STARR, M.B., B.S. (Sydney),
Medical Superintendent, Newcastle Hospital.

IT is now possible in many cases to forestall the onset of post-operative collapse of the lung (apneumatosis or massive atelectasis), to cure the condition once it is established, and to abort the condition of post-operative pneumonia which follows this condition of collapse.

Post-operative pneumonia is still an important contributing factor to surgical mortality rates. If its prophylaxis and treatment are rigidly followed, post-operative pneumonia loses many of its dangers and becomes a condition within the scope of therapy and cure. Various figures relating to its incidence have been published previously, varying from 0·5% to 10·5%, with varying mortality rates of 40% to 70%.

Every surgeon is persuaded that post-operative pneumonia, once definitely established, can be one of the most fatal of all conditions following surgical intervention. Clinically three forms of pulmonary infection are manifested which exhibit different clinical features. These do not include the terminal or hypostatic pneumonia of exhaustion, suppurative aspiration pneumonia, or suppurative embolic pneumonia.

Clinically the post-operative manifestations of respiratory infection include: (i) Post-operative bronchitis, a condition which we believe to be associated with increased bronchial exudate and to be due to a circulatory imbalance in the lung. If encountered in normal patients, it infers incorrectly administered anæsthesia; if in patients suffering from precedent respiratory infection, debility or sepsis. Its incidence is very likely even following a well administered anæsthetic in the latter. (ii) Post-operative apneumatosis (or collapse) and pneumonia, in which lobar collapse is frequently encountered. (iii) Post-operative bronchopneumonia, in which lobular collapse is frequently encountered.

The clinical manifestations of the two last mentioned will be considered.

POST-OPERATIVE PULMONARY COLLAPSE (APNEUMATOSIS) AND PNEUMONIA.

Ætiology.

Any inquiry into the subject of post-operative collapse must indicate its deference to the brilliant and painstaking investigation of the American school of clinicians. Apparently it has been conclusively demonstrated that all the following factors fulfil a definite ætiological rôle.

Predisposing Factors.

1. *Oral Sepsis.*—Oral sepsis has been advanced as a predisposing cause, but in our experience is not a constant concomitant of the condition.

2. *Debility and Sepsis.*—Three of our sixteen cases were encountered in old people over the age of sixty-five years, and four cases occurred in patients suffering from acute gangrenous appendicitis.

3. *Precedent Respiratory Affections.*—One patient suffered from a resolving coryza and three from chronic respiratory infection (chronic bronchitis).

4. *The Anæsthesia.*—(*a*) Type of anæsthesia. Table I demonstrates the safety of intratracheal anæsthesia and the incidence of post-operative pneumonia following basal anæsthesia despite intratracheal administration of ether.

TABLE I.
Showing Post-Operative Pulmonary Complications in 4,584 Operations.

Type of Anæsthesia.	Number of Cases.	Post-Operative Pulmonary Complications under Consideration.	Deaths.
Ether with the open method ..	3,395	10	3
Ether with the intratracheal method	447	Nil.	—
Local anæsthesia for major operations excluding those on the ear, nose and throat	15	1	1
Basal anæsthesia *plus* ether by the open method	9	2	1
Basal anæsthesia *plus* ether by the intratracheal method	11	3	1

(*b*) The duration of the operation. We encountered no post-operative pneumonia in anæsthetics of less than twenty to thirty minutes' duration. Nine hundred and fifty curettages performed under general anæsthesia showed no post-operative pulmonary complications. The operation in all our sixteen cases exceeded thirty minutes in duration. The period of anæsthesia is therefore important.

(*c*) Administration of the anæsthesia. Not sufficient stress has been laid on the rôle of the anæsthetist. Experimentally the importance of obviating straining respiration during the anæsthesia and of maintaining a perfectly free airway has been shown conclusively by Van Allen and Adams.(1) Their conclusions are as follows: (i) Quiet or suppressed respiration with bronchial obstruction does not lead to pulmonary collapse in the normal lung. (ii) Straining respiration is essential to the production of obstructive pulmonary collapse in the normal lung. (iii) Valvular obstruc-

tion produces collapse much more rapidly than does total obstruction, although there is no evidence that valvular obstruction occurs spontaneously in man. These conclusions must bear no relation to the incidence of post-operative collapse under local anæsthesia, but are very interesting in indicating the predisposing factors in post-operative collapse following general anæsthesia. Further, straining respiration may be eliminated by careful anæsthetization employing basal anæsthetics, but the incidence of post-operative collapse is not necessarily thereby diminished.

It remains an interesting clinical fact that anæsthesia in private practice is less productive of post-operative pulmonary collapse than in public hospital practice. It is my experience that post-operative collapse is encountered more frequently following anæsthesia at the hands of certain anæsthetists, who are not meticulous regarding the maintenance of a perfectly free airway. Too often Hewitt's airway becomes the scapegoat for a carelessly induced anæsthesia. The student is taught that Hewitt's airway will maintain a free airway, but in reality a careful anæsthetic induction is to be preferred as a means to achieve this end.

5. *Circulatory Imbalance in the Lung.*—The delicate balance which exists between circulation and ventilation in the lung is readily disturbed by prolonged surgical trauma and prolonged anæsthesia, especially if the latter be rendered more difficult by an imperfect airway. The statements of Coryllos and Birnbaum that "circulation and ventilation of the lung are parallel functions" and that when "ventilation is impaired, circulation is decreased, and conversely" are worthy of consideration. Pulmonary circulatory stasis is a corollary of post-operative hypoventilation, which is referable to the post-operative depression of the respiratory centre. Pulmonary stasis and pulmonary œdema must be important factors in the incidence of post-operative pneumonia following local and spinal anæsthesia.

6. *Post-Operative Nursing Positions.*—In 315 consecutive abdominal operations under ether anæsthesia induced by the open method in which the patients were treated in the dorsal decubitus for twelve to fifteen hours following operations, one post-operative pneumonia was encountered. This period permits recovery of the respiratory centre, with consequent recovery of the pulmonary circulation and improvement in the pulmonary ventilation. It is logical to infer that, when all cases of post-operative massive collapse chiefly affect the lower lobes, the sitting or Fowler's posture is not entirely innocent. Elevation of patients into Fowler's position after operation before complete consciousness was attained resulted in fourteen cases of post-operative pneumonia, although no post-operative complications occurred in 447 cases of anæsthesia induced intratracheally in which the patients were nursed in the dorsal decubitus till consciousness returned. In three out of seven cases of basal anæsthesia *plus* intratracheally administered ether, in which the patients sat up before being fully conscious, post-operative collapse occurred. It is more logical to support the contention of Boulan and Sheret that the patient should be treated in the dorsal decubitus for twenty-four hours after operation.

7. *Chilling.*—The rôle which chill plays is debatable. Institutions in which the operating unit is segregated, requiring the transport of the patient through the open for a considerable distance, do not apparently show any increase in post-operative pulmonary complications. In all such institutions every care is taken that the patient is kept warm during transport.

Exciting Factors.

1. The first exciting factor is post-operative depression of the respiratory centre resulting in: (*a*) Hypoventilation of the lungs. This condition follows all operations, and especially upper abdominal operations. In some upper abdominal operations the reduction in expansion of the chest was as high as 79%, and the limitation of the diaphragmatic excursions as much as 66%.[3] The diaphragm after operation occupies a constant high position without paralysis.[4] (*b*) Diminution of the vital capacity. All operations are followed by a definite diminution in the vital capacity and a reduction in the reserve of the respiratory functions. The vital capacity may be reduced even as much as 77%. These figures were first established on patients who developed no post-operative pulmonary complications. In a series of 25 cases the vital capacity after operation showed a 66% reduction.[3]

2. The second exciting factor is inhibition of the normal lung defences. These are inspiratory dilatation of bronchi, the alternating strong respiratory currents of air, the ciliary movements of the respiratory epithelium, and the expulsive powers of coughing, with a possible antibacterial action of the bronchial mucus. So long as the bronchi are open and their drainage is insured, the lung maintains asepsis by the mechanical methods at its disposal, that is, evaporation, expectoration, activity of the ciliary epithelium and the antiseptic power of its mucus (Arloing[5]). Climatic variation and the production of chill probably affect the lung by reducing the efficiency of the lung defences.

3. The third factor is the establishment of localized bronchial occlusion. The occlusion is usually established in one of the main bronchi supplying the lower lobes of the lung. The exact method of the establishment of occlusion is under discussion. Viscid tenacious mucus has been advanced by many authorities[6] and has much scientific data to support its indictment, but the fact remains that after the aspiration of the occluding mucus and reinflation of the lung the excursions of the diaphragm are not reestablished, as one would expect. Further, the localization of the lesion to one bronchus is difficult to explain when the ætiological factors are generalized. Other

authorities have advanced reflex localized contraction of the bronchial musculature, but again the localization of the lesion renders the acceptance of this theory very difficult.

The onset of lobar collapse cannot be attributed to deficient diaphragmatic function, for it has been shown that the lost diaphragmatic motion on one side in dogs did not prevent the aspiration of material into the base of that lung during inspiration to a degree equal to that on the unaffected side. Hence the lower intercostal muscles and the intrapleural pressure must exert some action on the lower lobe of a lung during inspiration.[7] Nevertheless, diaphragmatic elevation is a concomitant of the pathological process present, and its presence is very constant.

Bronchial occlusion, of whatever nature, will produce, clinically and experimentally, an identical condition of affairs. Further, as Van Allen and Adams have also shown, decreased intrapleural and intrabronchial pressures occur characteristically in obstructive pulmonary collapse.[1] Therefore all those factors are present for the aggravation of the condition and its definite progress towards the establishment of pneumonia without any constant tendency to self-cure, although I once witnessed such a spontaneous cure.

Apparently, therefore, depression of the respiratory centre with consequent failure of the primary lung defences is the important factor. Bronchial occlusion in the lower lobes follows because the patients are nursed in the sitting posture before the expulsive pulmonary functions are rehabilitated. It is logical to compare the condition with pulmonary abscess and bronchiectasis and to attempt remedy by postural means. The onset of atelectasis, which, as Coryllos and Birnbaum have shown, is accompanied by marked impairment of the associated circulation due to alveolar collapse,[2] establishes all conditions favourable to bacterial multiplication. Pneumonia then supervenes and represents a progressive pathological process.

Pathology.

Pathologically the lung is airless, apneumatic, consolidated, and sinks in water. Apparently the affected segment of the lung is in an anaerobic condition and, as Kirk has shown, is very favourable to the multiplication of pneumococci. The primary febrile reaction on the part of the patient has been attributed to the absorption of secretions from the affected area.

Pneumococcus Type IV has been shown to be the responsible organism in the majority of such cases of pneumonia. In two of our cases pneumococci Type II and Type III respectively were isolated by the performance of lung puncture within a few hours after the establishment of the febrile reaction, but in a third case, in which the patient had a temperature of 39·7° C. (103·5° F.) the lung puncture was sterile. The affected portion of the lung is, in our experience, very dark violet in colour, and thick muco-purulent secretions can be made to exude from the bronchioles on compression. The alveolar surfaces are closely approximated and the alveolar spaces are obliterated. The alveolar capillaries are collapsed and the arterioles are dilated. A fibrino-purulent exudate is present in the bronchioles.

The radiological picture will confirm the condition once it is definitely established. In our experience it will confirm the clinical opinion when the lung is in the condition of collapse or pneumonic consolidation. Within the first few hours of the stage of collapse a definite opinion cannot be given. Morison[8] has synopsized the radiological appearance of the collapse zone. In our opinion clinical diagnosis can precede radiological diagnosis by some hours.

Clinical Features.

The clinical features are the most important aspects of this difficult problem. The diagnosis of the condition is a matter of hours. If a prompt diagnosis is affected, the condition is very frequently capable of successful therapy. Apparently the condition is clinically subdivisible into three stages: (i) the latent stage, (ii) the stage of pulmonary collapse, (iii) the stage of pneumonia. The first stage is the latent period following the anæsthesia, which was as a rule free from symptoms and lasted usually forty-eight to seventy-two hours, the patient being apparently quite well. In our series the shorter the latent period, the more serious were the subsequent features, and the more rapid the march of symptoms. The most frequent early symptoms in our experience were tachycardia, sweating and anxiety. Sweating was not invariably present and varied in degree from a clammy skin to a profuse perspiration. The anxiety was present in the majority of cases, but was not an invariable feature.

Tachycardia was a constant feature; the pulse rate rose from 20 to 80 points within the period of a few hours, and we endeavoured as far as possible to institute treatment at this stage.

It was present early in the stage of collapse, even before definite pulmonary signs could be elicited, and was invariably accompanied by some displacement of the apex beat of the heart. The stage of collapse, when fully developed, was accompanied by a rise in the respiration rate, and the patient not infrequently complained of dyspnœa. In our cases the rise in temperature was encountered only when the stage of collapse had been present from four to twenty-four hours. We can ignore the protests of Head, of Chicago,[9] concerning the physical signs, for our signs followed the classical course described by Osler. The affected pulmonary base moved less than its fellow, its percussion note was impaired, and apex beat and cardiac dulness were displaced toward the affected side, the breath sounds were high-pitched or tubular, the vocal fremitus and vocal resonance were increased and bronchophony was invariably present. In the early stages moist sounds were scanty. When this condition had been present for some hours the rise of temperature occurred,

usually from 38·9° to 40° C. (102° to 104° F.), but sometimes, and especially in those cases in which the latent stage was prolonged to three or four days and in which the tachycardia was not marked, the temperature was less than 38° C. (100·5° F.).

In our opinion the onset of the pyrexial stage was synchronous with the inception of the third stage and pneumonia. In this stage the features were those as a rule of severe lobar pneumonia. In two of our cases generalized bronchitic features with loud sonorous rhonchi were present throughout, concomitantly with the development of a right lobar collapse and lobar pneumonia. In those cases which we encountered before we instituted our present method of treatment, the temperature remained high, frequently with daily excursions greater than 2·5° F.

TABLE II.

Analysis of 16 Cases of Post-Operative Pulmonary Complications occurring in 4,584 Operations at Newcastle Hospital in 1933–1935.

Case.	Sex.	Age.	Anæsthetic Employed.	Operation.	Post-Operative Nursing Position.	Time of Onset of Features.	Nature of Pulmonary Complication.	Prophylactic Carbon Dioxide or "Carbogen".	Result.	Remarks.
1	F.	63	Paraldehyde *plus* O.E.	Cure of umbilical hernia.	Dorsal.	Hours. 48	Lobar collapse *plus* pneumonia.	No.	Death.	Does not represent one of 315 consecutive abdominal operations.
2	M.	48	O.E.	Gastro - enterostomy.	Fowler.	36	Lobar collapse *plus* pneumonia.	No.	Death.	
3	F.	66	O.E.	Vaginal repairs.	Fowler.	48	Lobar collapse *plus* pneumonia.	No.	Death.	
4	M.	46	O.E.	Acute appendicitis.	Fowler.	96	Lobar collapse.	Yes.	Recovery.	
5	M.	75	Narco-local.	Inguinal herniotomy.	Fowler.	30	Bronchopneumonia.	No.	Death.	Precedent chronic bronchitis.
6	M.	58	O.E.	Acute appendicitis.	Fowler.	36	Bronchopneumonia.	Yes.	Death.	From septic pericarditis in third week.
7	M.	43	O.E.	Ruptured duodenal ulcer.	Fowler.	20	Bronchopneumonia *plus* lobar collapse.	Yes.	Recovery.	
8	F.	37	Paraldehyde *plus* I.T.E.	Toxic goitre.	Fowler.	96	Lobar collapse.	Yes.	Recovery.	
9	F.	22	Paraldehyde *plus* I.T.E.	Toxic goitre.	Fowler.	30	Lobar collapse *plus* pneumonia.	Yes.	Death.	
10	F.	32	Paraldehyde *plus* I.T.E.	Toxic goitre.	Fowler.	36	Lobar collapse.	Yes.	Recovery.	
11	M.	15	O.E.	Acute appendicitis.	Fowler.	30	Lobar collapse.	Yes.	Recovery.	
12	F.	18	O.E.	Acute appendicitis.	Fowler.	36	Bronchopneumonia.	Yes.	Recovery.	Precedent coryza.
13	M.	48	O.E.	Cure of hydrocele.	Fowler.	96	Lobar collapse.	Yes.	Recovery.	
14	M.	42	O.E.	Ruptured gastric ulcer.	Fowler.	36	Lobar collapse.	Yes.	Recovery.	
15	F.	34	O.E.	Hysterectomy.	Fowler.	48	Bronchopneumonia *plus* lobar collapse.	No.	Recovery.	
16	F.	36	O.E.	Cholecystectomy.	Dorsal.	48	Bronchopneumonia.	Yes.	Recovery.	Precedent bronchiectasis.

O.E.—Ether given by the open method. I.T.E.—Ether given by the intratracheal method.

The pulse continually rose and the systolic blood pressure fell. The respiration rate remained high, the skin was hot and, as a rule, the sweating was profuse. Delirium frequently occurred, cyanosis was a constant feature, the condition of the patient deteriorated, and a fatal outcome in the fully developed cases frequently resulted.

TABLE III.
Showing Post-Operative Nursing Positions.

Position till Conscious.	Number of Cases.	Post-Operative Respiratory Complications.
Fowler	952	11
Dorsal	315	1[1]
Basal anæsthesia *plus* ether given by the intratracheal method *plus* Fowler position ..	7	3
Basal anæsthesia *plus* ether given by the intratracheal method *plus* dorsal position ..	4	Nil.

[1] Precedent bronchiectasis.

Diagnosis.

If the case is carefully followed, there is as a rule no difficulty in making a diagnosis when the condition is fully developed. Considerable care is necessary, however, to establish the diagnosis in the early stages of the condition. We stress the importance of tachycardia as an early feature. When it is combined with displacement of the apex beat, we consider the diagnosis established, though the pulmonary signs are indefinite. It is a matter of considerable ease, in those cases in which the apex beat is palpable, for the anæsthetist to make an ink mark on the chest to indicate before operation the position of the apex beat. The condition is by far the most frequent pulmonary complication following the operation in those patients who before operation had a normal respiratory system.

Prognosis.

In our opinion cure can be expected with adequate therapy: (i) in the latent stage before the condition is developed clinically, (ii) in the stage of pulmonary collapse, (iii) within the first eight hours of the establishment of the stage of pneumonia, that is, the stage of pyrexia with pulmonary consolidation. The prognosis as a rule after this period becomes the prognosis of severe lobar pneumonia and must consequently be very guarded.

Treatment.

Prophylactic Treatment.

Pre-Operative Prophylaxis.—(i) Oral hygiene is emphasized as a pre-operative measure for every condition and not post-operative pneumonia alone. (ii) Pre-operative training in deep breathing has not enjoyed the popularity of the surgeons which it probably deserves. It is apparently not a possibility in either private or public hospital practice in Australia.

Precautions During Anæsthesia. We believe that the pre-operative administration of atropine conduces to the diminished secretion of mucus from the bronchial tree. Further, in our experience, the administration of an anæsthetic with an incompletely free airway is a strong predisposing cause to the incidence of post-operative collapse and pneumonia. To maintain the perfectly free airway we feel that not sufficient stress has been laid on the hyperextension of the head by extending the occiput and lifting the point of the chin rather than forcing the angles of the jaw forward (which is tiring for the anæsthetist and productive of some post-operative discomfort to the patient). In our experience intratracheally induced anæsthesia is followed by far fewer post-operative pulmonary complications than any other form of anæsthesia.

Hyperventilation of the lung at the termination of the operation with carbon dioxide or carbon dioxide and oxygen has been frequently recommended by the American school, but has not been so successful in our hands as in theirs. It is our experience that hyperventilation of the lung is not so efficacious when the patient is not conscious. For the prevention of post-operative pulmonary collapse we contend that hyperventilation of the lung is possible only with a conscious patient. Three of our cases of post-operative pulmonary collapse commenced within seventy-two hours of the administrations of paraldehyde and hyperventilation with carbon dioxide and oxygen was carried out every half hour until the patient became conscious.

Post-Operative Treatment.—The majority of cases of post-operative pulmonary collapse can be prevented by: (i) nursing the patient in the dorsal position until full consciousness is attained, (ii) the exhibition of carbon dioxide and oxygen after operation. We have achieved equally good results with the pure carbon dioxide. We usually administer this therapy for the purpose of restoring the respiratory centre to its normal function by artificial means, and in this manner are rehabilitating the respiratory reserve and restoring the vital capacity and the pulmonary circulation. The restoration of circulatory efficiency is assisted by the exhibition of glucose, brandy and coffee *per rectum* during the first twelve hours. When carbon dioxide and oxygen are administered, we employ them at the rate of eighteen litres per minute and furnish to the patient from the cylinder his full respiratory requirements during the period of its exhibition. Our usual time for administration is for three minutes every hour for twenty-four hours. Recently we have employed pure carbon dioxide, using the Davies-Gilchrist machine. The patients frequently complain of discomfort if we administer the carbon dioxide at a rate greater than four litres per minute. The remainder of the respiratory requirements during the period of its administration we complemented with atmospheric air, and we have found that the best index of dosage is the tolerance of the patients. Further, this method is much more economical, which is a point of interest to hospital administrators. Even despite the exhibition of carbon dioxide, we have encountered cases of subsequent collapse, which, however, yielded to the treatment of the fully established condition. All such patients except one were nursed in the Fowler's position before they gained consciousness.

Deliberate Treatment.

When the condition of pulmonary collapse is established we make a practice of administering morphine, 0·011 gramme (one-sixth of a grain), and atropine sulphate, 0·43 milligramme (one one-hundred-and-fiftieth of a grain), hypodermically every six hours for four doses and of combining with this the administration of carbon dioxide or carbon dioxide and oxygen for three minutes in every half hour. We find that the exhibition of morphine will permit the patient to complete fuller respiratory excursions under the influence of the carbon dioxide. In our opinion no cardiac or vaso-motor stimulants are required during this stage, and the condition, even when fully established, will react to the exhibition of this therapy within forty-eight hours. After the lapse of twelve hours from the inception of the stage of pneumonia no definite prognosis can be given and the outlook in the majority of cases becomes that of a severe lobar pneumonia. We cannot agree with the statement that the majority of these cases of post-operative pneumonia improve spontaneously, as in our opinion it is one of the most fatal of all pneumonias, except epidemic influenzal bronchopneumonia.

POST-OPERATIVE BRONCHOPNEUMONIA.

Post-operative bronchopneumonia is, in our opinion, clinically distinct, but pathologically related, to the condition of apneumatosis in post-operative pneumonia. The condition pathologically and radiographically represents a multiple lobular collapse which is superimposed on a condition of generalized pulmonary œdema. We have encountered the condition much more frequently in patients who were previously suffering from some precedent respiratory infection, such as coryza, acute bronchitis, chronic bronchitis, emphysema or asthma. It is our impression that any respiratory difficulty during the period of anæsthesia which results in increased respiratory excursions with an imperfectly free airway will predispose to the development of post-operative bronchitis and bronchopneumonia. We believe that the theory advanced by Coryllos, namely, that the increased respiratory excursions of a patient with precedent respiratory infection, acute or chronic (which minimizes the defence reactions of the lung) results in embarrassment of the pulmonary circulation, especially if an imperfectly free airway be a concomitant of the anæsthesia. The increased respiratory effort without increased pulmonary ventilation results in the exudation of fluid from the pulmonary capillaries and arterioles into the alveoli and bronchioles. The presence of this fluid in the bronchioles predisposes to collapse of the lobule supplied, and resorption of the gases in these lobules leads to the condition of lobular collapse. The establishment of multiple anaerobic areas in which pneumococci can multiply leads to the onset of bronchopneumonia.

Clinical Features.

In our limited experience it infrequently happens that any latent period occurs between the period of anæsthesia and the period of onset of pulmonary complications of this nature. Definite signs of pulmonary œdema with generalized bronchitis are detectable clinically on the day following the operation. The progress of this condition is towards multiple lobular consolidation of the broncho-pneumonia type. In one such case post-operative apneumatosis developed at the base of the right lung with displacement of the apex beat twenty-four hours after the operation. We believe that both conditions may be present simultaneously in the one patient, and that therefore the pathological basis is similar.

The cough and sputum as a rule represented the first symptoms. Not infrequently both had been present before operation and persisted after operation. The onset of generalized bronchial infection was accompanied by a mild rise of temperature and pulse and a slight increase in the respiration rate. The progress of the condition was heralded by a further rise of temperature, slight rise of pulse rate, development of pallor and cyanosis. The sputum as a rule was greenish-yellow, viscid, with a considerable admixture of serous bronchial exudate. The condition, we believe, differed clinically from pulmonary collapse in that its progress was gradual, the symptoms were usually present immediately on recovery from anæsthesia, and the established condition of bronchopneumonia was usually not encountered for forty-eight to seventy-two hours. The physical signs were basal and bilateral. There was no evidence of displacement of the mediastinum, the movements of the chest were diminished but equal, the physical signs of pulmonary œdema were detectable at the bases posteriorly, and the signs of acute bronchitis over the lungs generally. When the condition of bronchopneumonia was established, multiple localized patches of tubular breathing were detectable, with râles audible throughout as a rule, this tubular breathing thus differing from the high, dry tubular breathing of the pneumonic lung following collapse. The clinical course of these operations was difficult to predict, and a fatal issue was not infrequent.

We believe that the prognosis depends on the condition of the heart and circulation. One patient showing apparent improvement died on the seventeenth day from a septic pericarditis that had supervened on the pulmonary condition, which, we thought, was in a stage of resolution. As this condition so frequently supervenes in patients who are aged and whose circulation is not adequate to withstand the onslaught of surgical trauma, the prognosis is difficult to furnish.

Treatment.

Most of the treatment is symptomatic. We have found that considerable improvement follows the exhibition of carbon dioxide and oxygen. A mixture of 5% carbon dioxide in oxygen assists in the reestablishment of a pulmonary reserve which, even in the condition of relative normalcy for these

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patients, is not very good. The exhibition of carbon dioxide pure is not, in our experience, so satisfactory. One can understand the excellent results published by the workers at the Mayo Clinic, who subject their patients after operation to an atmosphere rich in oxygen, even to the extent of 40% to 50%. In our opinion, however, carbon dioxide 5% in oxygen has been infinitely more practicable. Its administration is commenced as soon as the patient is conscious, because we believe that pulmonary hyperventilation is best exhibited in conscious patients (thus insuring a free airway). Further, the patients feel refreshed after each treatment and describe the "Carbogen" from the cylinder as "mountain air". Definite assistance is obtained in the expectoration of the sputum, which in these cases is viscid, tenacious, and characteristically difficult to expectorate. The outlook, once the condition is definitely established with pyrexia, tachycardia, dyspnœa and cyanosis, is serious, and in these circumstances we exhibit symptomatic treatment, of which we consider morphine and atropine and the vasomotor and cardiac stimulants the most important. We cannot speak with confidence of the excellence of our modes of therapy in bronchopneumonia, believing that the treatment of the incipient bronchopneumonia in the stages of generalized bronchitis and pulmonary œdema is preferable to the most distinguished therapy which could possibly be exhibited in the stage of the condition once established.

We are aware that the exhibition of this therapy *in toto* has taken place in a public hospital where facilities for treatment are much greater than in private practice. Nevertheless, "Sparklet" carbon dioxide is now procurable and is within the realm of every general practitioner to employ.

In our experience the most accurate measure of the rate of flow of carbon dioxide is communicated by the patient, who as a rule experiences definite discomfort when the rate of flow exceeds three and a half to five litres per minute. Its prophylactic use is of greater value than the treatment of the established condition.

We have attempted to indicate the rôles which (*a*) an imperfectly free airway and a consequent difficulty during anæsthesia, (*b*) an early diagnosis of the condition, (*c*) the importance of post-operative posture, and (*d*) the prophylactic value of carbon dioxide occupy in the establishment and therapy of the post-operative condition.

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I beg to acknowledge my indebtedness to Dr. S. S. Gardiner, of the honorary staff of the institution, for his assistance in placing so much literature at my disposal; to the Board of Directors of the institution for the facilities which they have placed in my hands to investigate the worthiness or otherwise of the general exhibition of "Carbogen"; to the honorary staff of the institution for permission to publish the cases; and to the resident medical staff for their unfailing assistance.

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HODGKIN'S DISEASE: SOME CLINICAL ASPECTS, WITH SPECIAL REFERENCE TO THE EFFECTS UPON THE HÆMOPOIETIC TISSUES AND THE NERVOUS SYSTEM.

By ERIC L. COOPER, M.D.,
Marion Carty Research Fellow, Walter and Eliza Hall Institute, Melbourne.

AT a time when the interest in lymphadenoma is concerned with the search for an ætiological factor, there may be some advantage in a clinical study of the disease. To this end some sixty-seven case histories have been reviewed; in each instance the diagnosis has been made by histological examination of a lymph gland removed during life or *post mortem*. Cases in which the histological report was indefinite have been excluded. Of this total, occurring during the last ten years, the majority of patients were treated by deep X ray therapy, fifty as in-patients and the remainder in the out-patient department of the Melbourne Hospital.

Hodgkin's disease is defined as a gradually progressive, painless, glandular enlargement frequently associated with splenomegaly, enlargement of the liver, fever and progressive anæmia (Lemon and Doyle[1]). In the lymphatic glands and other tissues involved there occurs a peculiar modification of the lymphoid and endothelial elements. The characteristic features of this "Hodgkin's tissue" include the presence of endothelial giant cells (of the Sternberg-Reed variety), masses of endothelial cells and eosinophile cells of both mononuclear and polymorphonuclear type. There is also a tendency to replacement of the reticulum of the lymphoid structures by dense avascular fibrous tissue.

The histological picture is common to all types of Hodgkin's disease, under whatever name the condition is described. Lymphogranuloma, lymphoblastoma, *lymphogranulomatosis maligna* and lymphadenoma are a few of the names given to this disease first described by Thomas Hodgkin at Guy's Hospital in 1832. It is of interest to note that of the seven cases originally described by

Hodgkin only two would now be classified as lymphadenoma or Hodgkin's disease, reexamination of the remainder having revealed tuberculosis, syphilis, leuchæmia or lymphosarcoma (Symmers[2]).

Lymphadenoma is a relatively uncommon disease. It may arise at any period of life from early infancy to extreme old age. In this series the youngest patient was three years of age at the onset of the disease, the oldest seventy-five years; the average age at onset was 38·6 years. Young adult males of relatively broad type of build with wide face and fair hair seem to be peculiarly susceptible to Hodgkin's disease. Males exceed females in most reported series, and in the group of cases recorded here there were forty-eight males and nineteen females.

The duration of the disease may be a few months or may extend over many years. Those cases beginning with a local glandular enlargement may be controlled by deep X ray therapy for five years or more. On the contrary, those patients in whom anæmia is marked at an early stage rarely last more than a few months. Occasionally Hodgkin's disease terminates in an actively infiltrating sarcomatous condition which fails to react to X ray therapy (Scott and Cooper[3]), but the majority die either from progressive anæmia or from mediastinal pressure.

In a majority of patients the first evidence of Hodgkin's disease is a painless glandular enlargement, most frequently in the cervical region (Horder,[4] Yates[5]). Of sixty-seven patients coming to the Melbourne Hospital 54% reported because they had discovered enlarged glands in the neck. The overwhelming preponderance of cervical glandular enlargement is further illustrated by the fact that at their first examination fifty-five patients out of sixty-seven had palpably enlarged cervical glands. Primary involvement of the inguinal and axillary glands occurs in very few patients.

Although splenomegaly is usually regarded as a feature of the disease, only 30% of patients in the present series had a palpable spleen at any time during the course of the illness. In some patients the spleen may enlarge before the superficial lymphatic glands become palpable; this splenic type of Hodgkin's disease is usually associated with severe anæmia.

Pruritus is remarkably common, being the first symptom in many patients (Galloway[6]), particularly in those in which the disease runs a relatively rapid course; on the other hand, it may be a warning that a chronic case is failing to react to X ray treatment. Pruritus is only occasionally associated with the other skin lesions of Hodgkin's disease—pigmentation and lymphomatous nodules. It is frequently followed by pustular conditions following excoriation. There seems no obvious relation between the occurrence of pruritus and the degree of eosinophilia in the blood.

Some fever occurs in most patients at some stage of Hodgkin's disease. In this series 43% showed a pyrexia which was usually of an irregular remittent type. The so-called Pel-Ebstein intermittent pyrexia, which was first described by Murchison in 1870 (Rolleston and others[7]) is a relatively rare manifestation (Hall[8]), only fifty cases being on record up to 1922 (Hall and Douglas[9]). While this type of periodic pyrexia is most often seen in Hodgkin's disease, it has been reported in other conditions (Horder[4]). In this series only four patients had pyrexia of the Pel-Ebstein type, but in one instance a sequence of ten days' fever, ten days' subnormal temperature, persisted regularly for 260 days.

Intrathoracic glandular masses are almost invariable at some stage of Hodgkin's disease (Ochsner[10]) and dyspnœa due to mediastinal pressure is one of the more common modes of onset. In addition to the usual massive enlargement of mediastinal lymph glands, which appear in the radiological film as discrete rounded masses of moderate density, Hodgkin's tissue may occur in discrete nodules in the lung resembling secondary malignant sowing (Hartfall[11]). In other patients a diffuse infiltration may occur throughout the mediastinum and extend into the lung (Wessler and Greene[12]), this being most common in the terminal stages of the disease when the glands fail to react to deep X ray therapy. While enlarged mediastinal glands may be the only manifestation of the disease, they are more usually associated with palpable cervical glands.

Jaundice occurring in Hodgkin's disease is sometimes of the hæmolytic type associated with marked anæmia, but in others it is due to obstruction by enlarged abdominal glands at the *porta hepatis* or to infiltration of the liver along the portal canals (Hare, Lepper and Weber[13]). In this series of sixty-seven cases, 12% presented some degree of jaundice which was usually associated with enlargement of the liver.

The Blood Changes in Hodgkin's Disease.

The only common change in the circulating blood in Hodgkin's disease is the development of an anæmia of the hypochromic type. The reduction of red cells and hæmoglobin, though progressive, is not very gross in the early stages, but in a few patients severe anæmia is the outstanding feature early in the disease. In this series, in only forty-two patients was the hæmoglobin percentage recorded; in twelve it was over 75%, and in six it was below 35%. More than one-half of the patients who died had hæmoglobin of under 50% at their first examination, and every patient with hæmoglobin under 35% died within a relatively short period.

In other words, the degree of anæmia is an indication of the probable course of the disease. A patient with local glandular enlargement in which a remission has been induced by deep X ray therapy has an expectation of life of from three to five years, but if the hæmoglobin shows a progressive fall, then death due to cachexia will follow in a relatively short period. Alternatively, though the lymphatic glands which were first enlarged disappear fol-

lowing X ray treatment, yet the patient may die of cachexia and anæmia within a few months. On the contrary, Hodgkin's disease may respond to treatment, but progressive anæmia may lead to a fatal result after many years, though no glands are palpable at the time of death.

The anæmia is usually of the microcytic hypochromic type, yet occasionally an aplastic anæmia or even a hyperchromic macrocytic anæmia may occur in Hodgkin's disease. In the appendix to this paper there are reported in detail two cases of anæmia in Hodgkin's disease, in both of which the diagnosis was in doubt, owing to the type of the anæmia.

One patient (O.A., Appendix 1) died of hæmolytic anæmia of acute type, and the diagnosis of Hodgkin's disease was made only at autopsy. No lymphatic glands were palpable during life, and only the abdominal glands were found enlarged at the *post mortem* examination. The other patient (N.S., Appendix 2) had a few small superficial glands, one of which revealed typical changes. A similar case has been reported by Parkes Weber and Schwarz.[14] In any severe anæmia, before a diagnosis of primary anæmia of hæmolytic or other type is made, the possibility of an atypical Hodgkin's disease must be considered.

The anæmia in Hodgkin's disease is usually of the hæmolytic type associated with toxæmia, cachexia and destruction of red blood cells, particularly in the spleen. The increased indirect Van den Bergh reading and the deposition of iron pigment in the liver are evidence of hæmolysis. Additional factors, such as toxins acting upon the bone marrow affecting the formation of red blood cells and the replacement of large areas of bone marrow by masses of lymphadenoid tissue may also play some part.

Sometimes the anæmia is of the aplastic type, particularly when the bone marrow is replaced by masses of Hodgkin's tissue. Macrocytic hyperchromic anæmia occurs in Hodgkin's disease but rarely. Davidson[15] has reported three cases of lymphadenoma in which a high colour index, macrocytosis and achlorhydria suggested pernicious anæmia; but a reticulocytosis prior to the administration of liver extracts and a polymorphonuclear leucocytosis were unusual features in untreated Addisonian anæmia.

The changes in the white blood cells have long been the subject of dispute. An increase of moderate degree in the total leucocyte count is usual, but very high figures have been reported in undoubted cases of Hodgkin's disease. In this series one patient had a white count of 64,000 per cubic millimetre, which could not be accounted for by any septic complication, and several others had counts of over 25,000. On the contrary, extreme leucopenia has been reported (Simmonds[16]), and one patient in this series had a total leucocyte count of 900 white cells per cubic millimetre.

The influence of deep X ray therapy on the blood picture must be borne in mind, since aplastic anæmia associated with leucopenia may follow excessive radiation. In the cases reported in the appendix, severe anæmia and leucopenia were evident before the exhibition of X ray therapy. Apparently the products of Hodgkin's disease have in some instances a detrimental action on the formation not only of the erythrocytes, but also of the white blood cells. X ray therapy may be contraindicated owing to the degree of leucopenia and of anæmia.

The leucocytosis in Hodgkin's disease is usually of the polymorphonuclear cells, but in the early stages of the disease an increase of lymphocytes is not uncommon. Later, as the lymphatic areas become replaced by dense fibrous tissue, lymphopenia is almost invariable. In this series the lymphocytes were below 15% of the total white cells in seven out of nine patients in whom the disease was of two years' duration or longer.

Eosinophilia in Hodgkin's disease has been discussed since eosinophile cells were described in the glands in 1892 (Sears[17]). The contrast between the almost invariable increase of eosinophile cells in the glands and their only occasional increase in the circulating blood is of great interest (Weber and Bode[8]). In this series the highest eosinophile count was 15% in a total white count of 64,000 per cubic millimetre; in the whole series 18% of the patients had an eosinophilia of over 4%. This figure is similar to those reported by Conybeare[19] and by Buntine.[20] This last authority also refers to an increase in blood platelets and in large mononuclear cells during some phases of Hodgkin's disease; these features have not been noted in the series of cases here reviewed.

In summary of the hæmopoietic changes it may be stated that there is no blood picture typical of Hodgkin's disease. A progressive hypochromic anæmia with a polymorphonuclear leucocytosis of moderate grade is the most common finding, and, in the later stages, a relative and absolute lymphopenia is not uncommon. Eosinophilia is of no value in diagnosis or in prognosis.

Lesions in the Bones and Nervous System.

The bones are frequently involved late in Hodgkin's disease (Jenkinson[21]) and the most common method of invasion is through the periosteum from adjacent lymphatic glands. Occasionally, isolated nodules resembling carcinomatous metastases occur in the bones (Carver and Copeland[22]); these masses extend from the bone marrow, which is involved in a large proportion of cases of Hodgkin's disease (Montgomery[23]).

The more common changes in the bone marrow are those of hyperplasia due to the blood destruction and to the effects of the disease on the marrow cells. In the later stages the bone marrow may show a fine fibrosis with destruction of the essential hæmopoietic cells. In other patients the marrow may be replaced by nodules of Hodgkin's tissue similar to that found in the lymphatic glands and elsewhere. It is this type of bone marrow involve-

ment which gives rise to osteoporosis, and more rarely to osteoplastic changes.

The bones of the spinal column, pelvis, sternum and ribs are most commonly affected, but nodules have been found in the skull and long bones. The vertebræ are involved by direct extension from the mediastinal and abdominal glands and actual destruction of bone with consequent kypho-scoliosis may result. More commonly the invading Hodgkin's tissue extends through the intervertebral foramina and compresses the spinal cord and nerve roots. Extension occurs along the vertebral canal, in the loose tissues of the extradural space, which contains lymphoid elements (Cooper[24]). Very rarely a mass of Hodgkin's tissue arises in these lymphoid nodules within the spinal canal without bone involvement (East and Lightwood[25]).

Compression of spinal cord or *cauda equina* usually arises late (Parkes Weber[26]), but occasionally a progressive paraplegia is the first sign of Hodgkin's disease.

A case is reported in detail in the appendix (H.W., Appendix 3), in which the first symptom was paraplegia; and another patient amongst those reported in this paper was operated upon for spinal compression, and when a section of the tumour mass was removed at laminectomy a diagnosis of endothelioma was made. This patient later developed Pel-Ebstein pyrexia and typical changes of Hodgkin's disease were found *post mortem*. A similar case is reported by Delius.[27]

In these instances of invasion through the intervertebral canals (see illustration) the Hodgkin's tissue behaves more like a neoplasm than an inflammatory lesion, and nodular masses are often found in the muscles of the back (Johnston[28]). Hodgkin's nodules are very rarely found in the brain, but occasionally the cranial nerves are compressed by invading tissue from the cervical glands. Pressure on the recurrent laryngeal nerve rarely produces laryngeal paralysis, and lesions of the cervical plexus are also uncommon.

Symptoms of involvement of the nervous system are most commonly due to pressure on the spinal cord or nerves, as described above, but in some instances no actual compression can be detected at *post mortem* examination. In these there is found a long tract degeneration, particularly of the posterior and lateral columns, due either to anæmia or to the general systemic effects of Hodgkin's disease (Forrest[29]).

Summary.

1. An analysis is made of sixty-seven cases of Hodgkin's disease occurring at the Melbourne Hospital in a ten-year period.

2. A *résumé* of the main histological and clinical features of Hodgkin's disease is given, with special reference to pruritus and fever.

3. The changes in the circulating blood are discussed and the conclusion is reached that the only common finding is hypochromic anæmia with polymorphonuclear leucocytosis; lymphopenia occurs late in the disease.

4. Involvement of bones by Hodgkin's tissue is described.

5. The occurrence of nervous lesions in Hodgkin's disease is discussed, these being due usually to compression of the spinal cord and rarely to tract degeneration.

Figure showing invasion of spinal canal by Hodgkin's tissue through the intervertebral foramen compressing the *cauda equina*. (Natural size.)

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I have to thank Dr. R. P. McMeekin for permission to report Cases I and III, and Dr. Hilda Gardner for the various blood examinations.

Appendix 1.

O.A., a female, aged forty-nine years, stated that ten months previously there had been some swelling of the abdomen, which gradually subsided over a period of three weeks. Since then she had been quite well, except for some dyspnœa on exertion. For three weeks she had noticed weakness and swelling of the abdomen again, both

of which slowly increased. All the extremities were œdematous and she became progressively paler.

There was general anasarca and extreme pallor, but no petechiæ were seen. The tongue was clean, but not glazed. There was free fluid in the abdomen, the liver edge was palpable and the spleen was greatly enlarged. Ophthalmoscopic examination showed numerous retinal hæmorrhages with some œdema of the left optic disk.

Blood examination showed the hæmoglobin value to be 24%, erythrocytes to number 1,850,000 per cubic millimetre, and the colour index to be 0·66. The average diameter of the corpuscles by the halometer method was 7·3μ. The red cells showed anisocytosis and polychromasia with reticulocytes to the extent of 2%. Normoblasts were present in large numbers. Leucocytes were 900 per cubic millimetre, and a differential count showed a relative lymphocytosis (46%) with some immature granular cells (metamyelocytes 30%). The Van den Bergh test showed a delayed positive reaction, three units of bilirubin being present in the serum.

Post mortem examination was performed seven hours after death. The surface of the heart showed numerous petechial hæmorrhages, the muscle being pale in colour, with fatty changes. Microscopically the heart muscle showed degeneration and atrophy with early fibrosis.

The right pleural cavity contained two pints of clear yellow fluid, the lung being collapsed, with numerous petechial hæmorrhages on the surface. The mediastinal glands were not enlarged. The liver was large, with scarring of the surface of the right lobe. Microscopic sections of liver revealed intense fatty degeneration and atrophy with periportal fibrosis.

The spleen weighed 368 grammes (13 ounces) and was soft and dark in colour, with one puckered scar on the surface. Microscopically it showed typical Hodgkin's tissue, mononuclear and multinucleated giant cells being present in large numbers. The lymph glands in the hilum of the spleen were large, soft, and pinkish in colour. The retroperitoneal lymph glands were also very large and of similar appearance. These glands microscopically presented a confused picture of mononuclear cells with giant cells, some single and some multinucleated; in addition there was diffuse fibrosis, and the whole picture suggested Hodgkin's disease of fairly active type.

The bone marrow from the upper third of the femur was bright red in colour and of jelly-like consistency. Microscopically, there were large numbers of nucleated red cells of normoblastic type with an approximately normal proportion of granular white cells of all stages, including many eosinophile myelocytes and polymorphonuclear cells.

Appendix 2.

N.S., a male, aged forty-one years, was admitted to hospital with a history of marked lassitude for the previous six months; there had also been some cough with yellow sputum.

He had become progressively more and more pale and complained of dyspnœa on the slightest exertion. His weight had diminished by 25·2 kilograms (four stone) during the past two years.

Examination revealed an extremely pale, thin man, looking much older than his recorded age. Temperature on admission was 38·1° C. (100·6° F.), but fell to 36·1° C. (97° F.) on the fifth day, and remained subnormal until his death on the thirteenth day, the pulse rate being relatively slow throughout. In the left lung posteriorly there was an area of dulness in the upper lobe. X ray examination of the chest showed a loculated cavity in the left upper lobe—chronic pulmonary abscess. The spleen was easily palpable and the edge of the liver could just be felt. There were small glands palpable in both axillæ and in the cervical region.

The Wassermann test gave a negative reaction.

On blood examination the hæmoglobin value was 26%, the red blood cells numbered 1,658,000 per cubic millimetre, the colour index was 0·81. There were anisocytosis and poikilocytosis, and the reticulocytes were 1%. No nucleated red cells were seen. Leucocytes numbered 2,700 per cubic millimetre, with relative increase in granular cells; some immature forms were present (metamyelocytes 53%); there was a marked reduction of lymphocytes (8%).

Section of a lymphatic gland removed from the left axilla showed large endothelial cells similar to those of Hodgkin's disease.

Post mortem examination was performed fifty hours after death. In the upper lobe of the left lung was a large abscess cavity with some fibrosis around it. Smears from the pus in the cavity contained no tubercle bacilli, and there was no microscopic evidence of tuberculosis. The heart was small and the muscle pale.

The liver was small and dark in colour. In the mesentery were several calcified masses. The spleen weighed 315·6 grammes (twelve ounces) and upon the surface were numerous nodules of whitish colour; section showed irregular masses of whitish tissue. There were two small accessory spleens near the tail of the pancreas, which was surrounded by masses of large, white, hard lymphatic glands. The retroperitoneal glands were also very large and hard. The cervical glands were small, but firm, and white in colour.

Microscopic examination of all the glands showed typical Hodgkin's tissue with much fibrosis and many giant cells of the Sternberg-Reed type.

Appendix 3.

H.W., a male, aged thirty-three years, had always been in good health, with the exception of some stiffness in his back twelve years before admission. Over the past few years he had become progressively weak, slow at his work, and for nine weeks had difficulty in walking, which gradually increased. The muscles of his lower limbs were said to be "jumping", and for five weeks he had been confined to bed, being unable to walk at all. For four weeks he had some precipitancy of micturition, and on admission had incontinence of urine.

The patient was very pale. The hæmoglobin value on his admission to hospital was 70%, the red blood cells numbered 4,000,000 per cubic millimetre, there being a neutrophilia and marked reduction of lymphocytes. Eosinophile polymorphonuclear cells were present to the extent of 1%.

There were no abnormal physical findings in heart or lungs and, while the abdomen was distended, this was due mainly to a distended bladder. The edge of the spleen was palpable just below the left costal margin. The superficial lymph glands were not enlarged, but X ray examination of the chest revealed heavy root shadows with a glandular mass at the left hilum.

Examination of the nervous system revealed a flaccid paralysis of both lower limbs, the knee jerks, ankle jerks and superficial plantar reflexes all being absent. Sensory examination showed loss of all forms of sensation in the left lower limb below the knee, with some impairment of sensation in both the lower limbs in all skin areas below the second lumbar segments. No abnormal physical signs were found elsewhere in the nervous system.

Over the anæsthetic sacral area there was a large bed sore, and in the lower thoracic region and the whole of the lumbar region there was a sense of fullness in the muscles of the back. To the right of the first, second and third lumbar spinous processes was a swelling of indefinite outline which appeared to pit on pressure.

The cerebro-spinal fluid was clear and colourless, under normal pressure, and contained no cells and no globulin. The colloidal gold test and Wassermann test both gave negative reactions. Cisterna puncture yielded similar fluid, and lipiodol injected was found by X ray examination to be held up in the spinal theca at the level of the fifth dorsal vertebra.

The patient was in hospital for three weeks, running a swinging temperature, the maximum being 38·9° C. (102° F.). There was some infection of the urine, and hæmaturia occurred a few days before death.

Post mortem the spleen weighed 315·6 grammes (twelve ounces) and contained numerous white masses with some hæmorrhagic areas. The liver was enlarged, weighed 2,264 grammes (80 ounces) and contained similar white nodules. The retroperitoneal and mediastinal glands were enormously enlarged and of a uniform white colour.

Microscopically the glands, spleen and liver contained masses of endothelial cells, with numerous giant cells of the Sternberg-Reed type. The retroperitoneal glands contained more fibrous tissue than the other areas examined.

The muscles of the back were infiltrated by large masses of whitish tissue, which seemed to be continuous with the retroperitoneal glands. The Hodgkin's tissue had penetrated through the intervertebral foramina in the lumbar region and in the spinal canal had compressed and displaced the *cauda equina* and *conus medullaris* (see illustration). The subdural space at the level of the third lumbar vertebra was almost completely obliterated. No cause for the obstruction of the lipiodol in the thoracic region could be discovered. There were no masses of lymphoid tissue within the spinal cord itself, the compression being entirely extradural.

Microscopically the masses in the spinal canal and in the muscles presented a similar picture to the Hodgkin's tissue in the liver, spleen and glands.

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Reviews.

REFRACTION.

THE second edition of "The Practice of Refraction", by Sir Stewart Duke-Elder, in its general scheme, resembles the first edition, but has been improved by having new material added; and less important parts have been omitted, so that the book is slightly smaller than the first edition.[1] The sections are: (i) "Eye Strain", (ii) "Refraction", (iii) "Accommodation", (iv) "Muscle Balance", (v) "Clinical Methods", (vi) "Spectacles". Appendices are at the end.

The work is exceptionally well expressed. It is complete, but nowhere is there anything redundant. Among the many books on the subjects it stands preeminent. There is a fitting recognition that defects and disorders of the eye are intimately associated with the whole make-up of the patient, and cannot be effectively treated without the ability to correlate the general condition of the patient with the condition of the eyes. The ill-effects of small errors of refraction are plainly shown, and a necessary warning is given against carrying the treatment to an illogical conclusion.

The experienced ophthalmologist will derive pleasure from finding many of his own ideas expressed so clearly and concisely. The student will find in this book almost everything he should know on the subject.

CARDIOVASCULAR RADIOLOGY.

A WELCOME contribution to the question of the value of X rays in the study of the heart and aorta is made by J. Polevski in "The Heart Visible".[2] It is a sane and well balanced presentation of the case, free from over-emphasis, but showing clearly how much properly can be deduced from an X ray examination by an intelligent and experienced observer.

The author points out how far from constant are the shape and size of any individual heart; how these vary not only with the intrinsic cardiac movements, but also with the various phases of respiration, the general diaphragmatic level and many other extrinsic factors. He thus exposes the fallacy of the various elaborate systems of "cardiometry" put forward from time to time, based on the measurements of the instantaneous shadow cast on a film in one or another projection, as though the heart were a solid static object, instead of a flexible, kinetic organ. It is on a careful fluoroscopic study from all angles, supplemented by films taken in different projections, that so much can be determined, whilst the shape of the heart is of greater diagnostic significance than its size.

The use of the barium-filled œsophagus to demonstrate the enlargement posteriorly of the left auricle, or at a higher level to determine the calibre of the aortic arch, is well described, as are also the two main types of pathological deformation, the mitral and the aortic.

Other chapters deal with the varieties of alteration in the size of the heart in different pathological conditions: congenital lesions of the heart, cardiac aneurysms and tumours, pericardiac conditions, the great vessels *et cetera*. A full bibliography is appended.

The author writes as a physician and cardiologist, with a sound clinical sense, and whilst there is perhaps nothing very profound in his presentation of the subject, the book is well worth reading by all interested in cardiology, whether radiologists or physicians.

[1] "The Practice of Refraction", by S. Duke-Elder, M.A., D.Sc., Ph.D., M.D., Ch.B., F.R.C.S.; Second Edition; 1935. London: J. and A. Churchill. Demy 8vo., pp. 383, with 180 illustrations. Price: 12s. 6d. net.

[2] "The Heart Visible: A Clinical Study in Cardiovascular Roentgenology in Health and Disease", by J. Polevski, M.D.; 1934. Philadelphia: F. A. Davis Company. Royal 8vo., pp. 224, with illustrations. Price: $5.00 net.

The Medical Journal of Australia

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All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

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ANTE-NATAL CARE.

AT the present time the subject of maternal mortality and its prevention is much before the public. People are being invited to subscribe to a fund that will do honour to Their Majesties the King and Queen in celebration of His Majesty's jubilee, and that will be used in an attempt to lessen the mortality associated with childbirth. The medical profession has, through the British Medical Association, given its approval to the appeal, and is thereby pledged to take its part in any properly planned efforts that may follow. The reduction of maternal and infant mortality in childbirth presents a complex problem. Many solutions are offered and the arguments put forward by those offering solutions are mostly sound. At the same time everyone recognizes that there is no sovereign remedy—the remedy will be as complex as is the problem. The medical profession has to approach the problem from several different directions, and armed for each approach with special weapons. One of these avenues of approach lies in the pre-natal period and the weapon is ante-natal care.

Many will doubtless say that ante-natal care has been discussed so often that little may be gained from further reference to it. Those who hold this view will do well to read the account of a discussion held recently by the Royal Society of Medicine.[1] The subject for debate was: "How Can the Results of Ante-Natal Care be Improved?" and the views expressed were divergent, interesting and provocative. There was no general agreement such as would be found if nothing remained to be learned of the subject. One speaker was frankly pessimistic in his outlook and another was equally filled with optimism. Another found fault with the methods of ante-natal examination in common use. One speaker, G. W. Theobald, said that there was no reason to assume that ante-natal care, however well carried out, could lower maternal mortality, for it was no substitute for good midwifery—a somewhat gratuitous statement, since no one who knows anything about the subject would dare to suggest that it might act as such a substitute. Theobald thought that ante-natal care could be definitely harmful, as it made meddlesome midwifery almost inevitable. Again another speaker emphasized the need for adopting a philosophical rather than an academic outlook in efforts to establish, during the ante-natal period, a normal harmony of the working of the woman's mind and body. One of the members advocated the routine use of X rays in the ante-natal period for the discovery of abnormalities. This evoked a reply from another that if this were done much trouble might be found that did not exist, and more harm than good would be done. One of the most useful statements made at this discussion was that the more maternal mortality was reduced, the more difficult it became to effect further reduction. "It is generally a relatively simple matter to reduce the incidence of an accident from, say, 50% to 30%, but in the same circumstances to reduce an incidence from 0·5% to 0·3% is enormously more difficult. It calls not so much for organization on the large scale as for the highest judgement in the individual case, and judgement of this order is an attribute of a relatively few individuals." This

[1] *Proceedings of the Royal Society of Medicine*, February, 1935.

statement would be most useful if it were broadcast in Australia today. Again, ante-natal care is of little use unless it is followed by competent care during and after delivery; and ante-natal, intra-natal and post-natal care should be carried out by the same person. Possibly one of the London speakers was right when he said that much of the work of ante-natal clinics tended to be an eager search for the abnormal and that not enough attention was given to the support, encouragement and guidance of the patient who was fortunate enough to be passing through a normal pregnancy. Ante-natal care obviously should not end with the discovery of a satisfactory state of health; the patient's general living conditions and her emotional reactions need just as much attention as the condition of her body.

In this short discussion no reference has been made to methods of examination, types of clinic or how long supervision should last. These are the questions usually considered. In Australia many medical practitioners are prepared to give, and many do give, adequate supervision to pregnant women. The point that is scarcely ever mentioned, and one which lies at the root of the whole matter, is that many women, even when they know that ante-natal supervision is available to them, will not make use of it. There is no way of compulsion. It would be possible for the Commonwealth Goverment to make the payment of the maternity allowance contingent on the production of a certificate from a medical practitioner that the patient had submitted herself throughout pregnancy to the supervision of a medical practitioner, either privately or at a hospital clinic. The advent of a government brave enough to do this is yet awaited. In the present state of affairs ante-natal supervision must be its own advertising agent. Every woman safely piloted through pregnancy with skill, sympathy and understanding is an apostle of the doctrine. On the other hand, medical practitioners must remember that every woman who comes to grief after receiving perfunctory or half-hearted ante-natal treatment is not only a bad advertisement for the medical attendant, but for the science and art that he professes to follow.

Current Comment.

INFECTIONS IN THE NEW-BORN.

W. H. CHASE has reviewed 445 autopsies performed on babies up to one month of age.[1] He was impressed by the frequency in the tissues of a cell exudate which, conjoined with the history, indicated a bacterial or other irritant. Evidence of infection was found in 119 cases (26%) and was exceeded only by intracranial trauma (32%). Among the 119 cases exudative and purulent pneumonia occurred in 97 (81%), *otitis media* in 38, meningitis in 8, lesions of the umbilicus in 6, and miscellaneous foci in 8. The infections were classified as metastatic, aspiration and bronchial or peribronchial, with no extra-respiratory focus. Metastatic infection may be intrauterine or extrauterine. Intrauterine infection occurs from the mother through the placenta. Bacterial invasion of the fœtus may occur *in utero*. Chase points out that the mother may transmit to the baby almost any infectious disease, but the mode of transmission is not settled. It is assumed to be through the placenta, and absence of cell exudate does not exclude the possibility of bacterial transmission to the fœtus through its vessels. Metastatic pneumonia, in his opinion, includes most of the cases of "sepsis in the new-born". Here the term denotes all diseases caused by organisms resulting in other than localized signs. Twelve patients with congenital syphilis are included (of which eight had pneumonia) and a case of presumably transmitted pneumococcal infection. In only one case did the mother give a history of a suspicious skin rash, and in three infection was not suspected before autopsy on the baby. In these cases diagnosis was confirmed by a maternal Wassermann test. Chase holds that a positive maternal reaction is a diagnostic aid only when the baby gives clinical or anatomical evidence; and this evidence is of more value than the mother's serum reaction. In this series syphilitic changes in the placenta were of little aid. Six were examined, but characteristic lesions were absent or indefinite. Gross lesions as well as clinical symptoms of syphilis in the new-born often are not specific, and in these cases the appearance of the organs was unreliable. In only two instances was there a plantar maculo-papular eruption. Specific spirochætes were found only thrice, with two others doubtful. In all twelve cases a diffuse interstitial proliferative reaction with leucocytic exudate in several parenchymatous organs was accepted as evidence of congenital syphilis. Osteochondrosis was found once only. *"Pneumonia alba"* of Virchow was absent. The lung lesion consisted of variable interstitial connective tissue hyperplasia, most marked about the blood vessels. In some cases this was complicated by amniotic fluid constituents filling the bronchi and extending into alveolar spaces.

[1] *The Canadian Medical Association Journal*, January, 1935.

Collections of pus and leucocytes completed the picture of aspiration pneumonia. In many cases syphilitic pneumonia must be present and well advanced before birth. Aspiration pneumonia was the immediate cause of death in most of the congenital syphilitics. The altered tissue conditions may produce birth asphyxia, often followed by rapidly progressive aspiration infection.

Chase mentions a probable case of transmitted intrauterine pneumococcal septicæmia in an infant. The organism was cultured from exudates in the meninges and middle ear and was seen in lung sections, which showed purulent pneumonia. Pneumococci were cultured from the mother's blood before death, and autopsy showed diffuse lobar pneumonia and generalized septicæmia. The same organism was cultured from the placental site of the uterus, but no bacteria or exudate was found in the placenta or cord. The absence of cell exudate from these sites did not imply that pneumococci were not carried through their vessels to infect the fœtus. Chase states that infection may be extrauterine from a localized primary focus, such as the navel or intestine. The frequency of this group is deemed to be due to a low resistance of the new-born to pyogenic organisms. More skilful and aseptic management of labour has diminished the incidence of extrauterine septicæmia. In this series there were only six cases of pneumonia in which an exudative or purulent lesion of the umbilicus was a primary focus. In two there were ulcerative colitis and enteritis, indicating food infection.

Aspiration infection, intrauterine and extrauterine, accounted for 38, 17 being due to products of conception and 21 to food or naso-pharyngeal material. Chase assumes that, because of imperfect pharyngeal reflexes, infants may not swallow properly and bacteria-laden milk and vomitus enter the trachea and bronchi with organisms from the mouth and throat. Clinical evidence varied; difficulty in swallowing, cyanosis and nasal discharge were most often noted. Purulent *otitis media* occurred in one-third of the cases of extrauterine aspiration pneumonia, but in none of the intrauterine group. Chase considers that aspiration pneumonias have clinical and pathological features differentiating them from bronchial and peribronchial infections without a discoverable extrarespiratory focus. This latter group was 43% of the series. Pneumonia apparently followed a primary upper respiratory infection or some nutritional disturbance. Lymphogenous extension rather than aspiration was indicated. Purulent *otitis media* was the commonest associated lesion.

Chase gives a wealth of detail of the *post mortem* findings in his series of neonatal fatalities. Much investigation has been made on this subject in recent times. W. R. Shannon has described a syndrome of tetany with cerebral and generalized œdema in the new-born, due to interference with calcium metabolism and low calcium content of the blood and tissues. E. C. Dunham and M. T. Shelton have reported a case of multiple ulcers of the stomach in a new-born infant suffering from staphylococcal septicæmia of umbilical origin. Others have reported unexplained cases of rupture of the stomach. K. A. Heiberg described marked hyperplasia of the pancreatic islets in an infant dying two days after birth, having given evidence of hypoglycæmia. H. Cramer insists that Schultz's "swinging" method of resuscitation in *asphyxia neonatorum* may not only aggravate cerebral injuries, but may also cause aspiration of the amniotic fluid. He stresses the importance of reestablishing normal respiratory stimulus and advocates the use of lobeline. Chase's records contain no reference to intrauterine tuberculous infection of the infant from the mother.

"EVIPAN" ANÆSTHESIA.

THE drug known as "Evipan" has now been in use for some considerable time as an anæsthetic. It is the sodium salt of N-methyl-C-C-cyclo-hexenyl-methyl barbituric acid, and for anæsthetic purposes is given by intravenous injection. Its use is simple, and many medical practitioners have derived great satisfaction from its use. Of course certain precautions have to be observed with regard to it, and the anæsthetist has, as with any other anæsthetic, to be continually on the watch lest familiarity should make him careless. Attention should be drawn to a discussion held not so long ago at a meeting of the Royal Society of Medicine;[1] several of the points brought out by speakers may be emphasized, and those who are particularly interested in the subject should read the account of the discussion for themselves. R. Jarman said that he had had no deaths after two thousand injections. Some patients, in his experience, vomited if they received an opiate, but no patient who received "Evipan" alone vomited. He said that there had been something like 90,000 administrations of the drug in Great Britain since its introduction in 1933. Sixteen deaths had occurred, but, according to *post mortem* reports and coroners' findings, not one of the fatalities was attributed to "Evipan" anæsthesia. Jarman's conclusions are definite that "Evipan" should not be used single-handed, that it should not be given to patients in the upright position, that it should not be given to old or feeble subjects, and that an adequate airway should be maintained. R. R. Macintosh said that after a moderate dose of the drug the patient's capacity for sleep was diminished for some hours; he attached importance to this and said that a suitable sedative should be given. W. Alexander Low pointed out that a dose of morphine of one-eighth of a grain could be given and, if necessary, repeated, but that a larger dose might cause collapse. Nurses should receive definite instructions regarding the immediate treatment of collapse.

[1] *Proceedings of the Royal Society of Medicine*, January, 1935.

Abstracts from Current Medical Literature.

MEDICINE.

Medicinal Treatment of Heart Disease.

P. MORAWITZ (*Deutsche Medizinische Wochenschrift*, January 11, 1935) writes on the medicinal treatment of heart disease. Hormonal therapy, with such drugs as "Lacarnol", "Padutin", "Eutonon" *et cetera*, he damns with rather faint praise. He does not say these preparations are therapeutically worthless, but that the indications for their use are not yet understood. And he refers to the very conflicting opinions as to their value. These preparations are probably not true hormones, that is, not such as would have been passed into the circulation during life. And the several organ extracts which produce the same effect do not do so in virtue of some element common to all. Experimentally it has been shown that small intravenous injections of these preparations increase the coronary circulation and the blood in the skeletal muscles, with diminution of cutaneous circulation. Larger doses produce histamine-like effects, in lowering blood pressure. But clinical, not merely experimental, results are needed to establish the value of these "circulatory hormones". And even with the same preparation in the same disease different observers get quite different results. On the whole the author has had satisfactory results in those cases only in which the spastic element outweighed the anatomical. A typical example of such is the Raynaud-like vasomotor neurosis, as seen especially in women, with coldness, pallor and cyanosis of the hands. In angiosclerotic dysbasia and in migraine similar good results were obtained, but not with the same certainty. In *angina pectoris* the results were less favourable. It is obvious that a myocardial infarct would not be benefited, but even in the so-called effort-angina this treatment does not produce good effects with certainty. So inconstant are these effects that it is doubtful whether they are not attributable to the rest and hospital treatment. For averting an *angina pectoris* he relies rather on "Theobromin" and "Luminal" with glucose. In arrhythmias hormones were quite useless. In arteriosclerotic or diabetic gangrene it is dangerous to put off operation hoping for good results from hormone treatment. Painful experience has taught the author to expect nothing from this treatment in such cases. Vasomotor cramp, intermittent claudication, migraine and other headaches deserve a trial of hormone treatment. Glucose, much more commonly used than hormones in circulatory therapeutics, is of almost equally uncertain value. Intravenous injections of glucose were introduced to supply the affected heart muscle with something that it lacked. This original conception of cardiac failure through lack of sugar has been combated often and on good grounds, but intravenously injected glucose has been used more and more. And this because it is undoubtedly useful, though not for the reason originally alleged. The injection of 200 cubic centimetres of a 12% solution of glucose provokes an active osmosis. The blood is thinned, diuresis is usually caused, and dilatation of vessels. Replenishment of the glycogen stores of the liver probably helps in production of the good effect. In his own clinic the author gives intravenously glucose and strophanthin or glucose and digitalis. The indication *par excellence* for this treatment is *angina pectoris* with circulatory compensation. Many cases resistant to other treatment subsided during glucose treatment, often for a long period. The addition of insulin is not advisable. Sometimes it appears to increase the tendency to angina. Despite some failures, the glucose treatment has decidedly made good. And it is quite harmless. With the glucose, besides "Theobromin", the author gives sedatives for the heart nerves. He finds "Theominal" a good combination, or the following powder: atropine sulphate 0·0005 gramme, "Luminal" 0·05 gramme, chinidin sulphate 0·1 gramme, "Theobromin" natrio-salicylate 0·3 gramme. Calcium is well established as of value in the treatment of myocardial affections. Given by mouth, its effect was probably purely imaginary, the absorption being insufficient to be of any value. Intravenous injection was never popular. Calcium preparations suitable for intramuscular injection are available, and calcium therapy is reliable. Syphilitic disease of heart or vessels is usually a result of insufficient treatment in the primary or secondary stages. But it is a disastrous mistake to suppose that it is no use to treat syphilitic aortitis *et cetera*. "Salvarsan" is contraindicated in angina and in myocarditis with gumma, as it appears more liable than other remedies to cause further cicatricial narrowing of the coronary ostia. "Bismogenol" (or other bismuth preparation), one cubic centimetre every five days, and sodium iodide, at least three grammes daily, together with "Salvarsan", if these are well borne, are continued for ten weeks. And this course should be repeated three times a year for three years, even though the result of the Wassermann test be negative. This blood test is not a safe guide in the treatment of aortitis.

The Principles of Activity of Tuberculous Processes.

ALLEN K. KRAUSE (*Tubercle*, February, 1935) analyses the methods by which activity in tuberculous disease may be assessed. Though activity has no uniform or unequivocal way of manifesting itself, there are four kinds of evidence that may contribute to its appreciation. They are: pertinent particulars of antecedent history, manifestations of functional aberration, physical and radiological signs, and biological tests. It is generally agreed that the evidence of functional disturbance ranks highest. It is the effect upon the patient far more than upon the lung that will count in helping the clinician to judge the status of the patient's pulmonary tuberculosis. The slightest evidence of dysfunction caused by tuberculous infection is an indication of activity, and as long as the slightest symptom exists or can be induced, the infection must be regarded as active. Accordingly, activity is to be regarded as signalized not only by symptoms that are complained of or are ordinarily manifest to the observer, but also by any symptoms that can be elicited by subjecting a "suspect" to physical or psychical strain. It is poorly informed and inexpert practice to await the appearance of a definite symptomatology, or one that links fever indissolubly with activity in tuberculosis. Fever is only one symptom, and it is neither the most important nor the most revealing evidence of activity. It is probable that the most momentous and delicate symbol of all is over-fatigability, whether spontaneous or induced. Though no patient escapes this, many go on to advanced stages with their condition undiagnosed because fatigue has not been appreciated by the physician. The great desideratum for the physician is to recognize activity as early as possible. In determining activity, he practises the art of medicine in the highest meaning of the term.

Pain in Peptic Ulcer.

ANDREW B. RIVERS (*The Journal of the American Medical Association*, January 19, 1935) discusses the various theories put forward to explain the pain of benign ulceration of the alimentary tract. Studies were made on 393 cases of ulcer, in all of which direct inspection of the tissues involved in the morbid process was made and exact information regarding the history of the syndrome under consideration was available. An inquiry was made as to the situation of the lesion and as to the duration and character of the pain, its time of onset, mode of relief, and whether there were any appreciable differences in the general characteristics over the entire life cycle of the lesion under consideration. An effort was made to ascertain the location not only of the more recent areas of pain, but also of those experienced since the origin of the syndrome attributed to the patient's present illness. In most instances diagrams have been used whereon the situation of the distress has been accurately charted. In seven cases of ulcer of the œsophagus just

above the cardia, pain was present or intensified during deglutition, the sensation being felt in the lower sternal region with a tendency to radiate to the left neck and shoulder. More than 90% of patients with shallow gastric ulcers complained of poorly localizable pain. Definite localization was possible in 50% of cases in which the ulcer was large or subacutely inflamed. In 90% of cases in which the ulcer was perforating, the pain was accurately localizable to the left upper abdominal quadrant, usually near the costal margin. With invasion of the mesentery, mesocolon or abdominal wall, 93% of patients noted a shift of pain into the thorax or back. Obstructing duodenal ulcer usually produced diffuse epigastric distress, frequently with a loss of the sequence of symptoms assumed to be diagnostic of ulcer. As with gastric ulcer, the duodenal lesion which is non-perforating gives a poorly defined distress. Extensive or subacute ulcer frequently produced an accurately localizable pain. In 90% of cases perforating duodenal ulcers produced pain which was localized with accuracy to the right upper abdominal quadrant. Deeply penetrating ulcer here produced a shift of the pain to the region of the liver or to the back. Perforating ulcer in the region of a gastro-enteric stoma gave definitely localizable pain and, furthermore, they noted shifts of pain into the lower portion of the abdomen or into the back. The situation of pain caused by perforating stomal ulcers that invade the anterior abdominal wall is usually on a higher level than in those cases in which such ulcers perforate posteriorly. From these observations it can be stated that no definite rules of behaviour can be formulated which invariably apply to the pain or syndrome caused by peptic ulcer. The pain of a small shallow lesion is usually localized with some difficulty unless it produces mechanical disturbances. When the deeper tissues of the viscus are invaded, the syndrome becomes more definite and, with more severe pain, an area of more accurate localization can be determined. Penetration of the surrounding tissues leads to the appearance of a new pain, which may entirely supplant the original. Uncomplicated peptic ulcer probably asserts itself as a visceral phenomenon over the splanchnic nerves. The projecting pain of perforating peptic ulcer is in all probability the result of direct stimulation of the somatic nerves with a relay of these impulses as pain into the cutaneous branches of these nerves.

Malignant Nephrosclerosis.

H. E. MACMAHON AND J. H. PRATT (*The American Journal of the Medical Sciences*, February, 1935) describe malignant nephrosclerosis or malignant hypertension as a condition distinct from benign nephrosclerosis or hypertension, and also from the granular or contracted kidney resulting from disease of the arteries and arterioles described as "chronic vascular nephritis", arteriosclerotic disease of the kidney or hypertensive nephritis. In malignant nephrosclerosis a gradually rising systolic and diastolic pressure is maintained far above the normal, the heart enlarges, and vascular changes occur early in the retina and chorioid, for example, albuminuric retinitis. The specific gravity of the urine becomes fixed about 1010 to 1012; considerable albumin, casts and blood cells are found; later the non-protein nitrogen of the blood is raised and death occurs with vascular, cardiac or uræmic symptoms. The condition occurs in younger people and progresses rapidly to uræmic death in two to four years. Benign nephrosclerosis is a disease involving primarily the heart and blood vessels, runs a chronic course with any signs of disturbed kidney function far in the background, and mainly affects patients about fifty years of age. Sixty autopsies are summarized. Thirty-five of the patients died of uræmia, 10 of heart failure, two of aortic rupture, 12 of cerebral hæmorrhage. The heart weight averaged 600 grammes, showing concentric hypertrophy; the kidney was of normal size, congested, and showing petechial hæmorrhages. Microscopically changes were found in all the arteries (medium and small) and the arterioles, mainly in the arterial tree of the kidney; hypertrophy, narrowing and occlusion were noted; also destruction of the vessel wall with hæmorrhage into the surrounding tissues. The glomeruli were affected to the extent of 10% only, which distinguished the condition from chronic glomerulonephritis, in which 90% of glomeruli are affected. The ætiological factors are variable and uncertain.

The Irritable Duodenum.

JULIUS FRIEDENWALD AND MAURICE FELDMAN (*The Journal of the American Medical Association*, December 29, 1934) have made clinical and X ray studies in 100 cases of the irritable or unstable duodenum. Most of the patients were males between the ages of twenty and fifty years. The condition occurs more commonly than a survey of the literature would suggest. It has as yet not been clearly defined, and considerable confusion exists concerning its significance. The underlying cause is to be found in a disturbance of the neuromuscular mechanism of the duodenum, which may be the result of mechanical, chemical, allergic, nervous or reflex causes. The symptoms are by no means characteristic, and the condition may simulate duodenal ulcer, cholecystitis, appendicitis or other abdominal disorders, though these may be present as direct ætiological factors. Nervous and neurasthenic manifestations are usually prominent. Gastric hyperchlorhydria is more commonly present. Evidences of instability and spastic states in other portions of the bowel are quite frequent. The diagnosis is definitely established by means of X ray evidence, consisting in the detection of increased motility, transient irregularities and fibrillations, spastic manifestations and sensitiveness over the duodenum, together with an absence of an ulcer filling defect. Diet, rest and restoration of the nervous system to a more normal state are the essentials of treatment. Duodenal lavage and alimentation may be resorted to in severe cases with benefit.

Retintis in Diabetes.

HENRY P. WAGENER (*New England Journal of Medicine*, December 20, 1934) has reviewed the nature and incidence of retinitis occurring in 1,052 cases of *diabetes mellitus* examined over a period of three years. In the large majority of cases, whether hypertension is present or not, lesions of the retina, if present, are characteristic of diabetes and are not seen in similar form or distribution in any other disease. In the cases reviewed there was an incidence of hæmorrhagic lesions of the retina in 187, or 17·7%; hæmorrhage alone was observed in 5·5%. The various lesions are described under distinct types, but the types represent progressive phases in the development of a common underlying process. They are: (i) hæmorrhages alone, with no other lesion, (ii) hæmorrhages with punctate exudates, (iii) hæmorrhages with punctate and cotton wool-like exudates, (iv) hæmorrhages or exudates associated with visible lesions in the veins, (v) visible lesions in the veins with recurrent hæmorrhages into the vitreous and proliferation of new vessels and formation of scar tissue. The lesions occur predominantly in patients over forty years of age, and are usually, but not always, associated with hypertension or other evidence of general vascular disease. The frequency of coincidence of disease of the peripheral nerves and diabetic retinitis is high, the former occurring in 25% of all cases in which retinitis was present. In 66 of the 187 cases the eye grounds were examined two or more times over successive years. Progression of the retinal disease was noted in 37 of these cases, no change occurred in 25, while there was retrogression in four. The view is expressed that in some way at present unknown diabetes injures the finer arterioles or venules of the retina, probably the latter; that the injury is insufficient in degree in most instances to bring about abnormalities which are visible with the ophthalmoscope, but that when a visible abnormality is produced, it is characteristic. When the patient is afflicted with other diseases of the vascular system, particularly hypertension, the lesion characteristic of diabetes is superimposed on the other lesion, giving a composite picture that is still characteristic, so that the trained observer can diagnose from it the presence of *diabetes mellitus*.

British Medical Association News.

NOMINATIONS AND ELECTIONS.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

White, Harold Newbon, M.B., B.S., 1931 (Univ. Sydney), 28, Wolseley Road, Lindfield.

Public Health.

PUBLIC HEALTH WORK AND METHODS IN VARIOUS COUNTRIES.

THE following is the text of a report by Dr. A. R. Southwood, head of the Department of Public Health, South Australia, of an inquiry into public health work and methods in various countries. The report bears the date January 24, 1935. Parts of this report appeared in the issues of April 27 and May 4, 1935.

FACTORY AND INDUSTRIAL HYGIENE.

Factories Supervision in England.

My inquiries into factory and industrial hygiene were restricted to England. There the administration of the legal enactments relating to this subject is in the hands of the Factories Department, under the Home Office. The Factories Department is not directly associated with the Ministry of Health, but there is effective cooperation in all medical matters between the Ministry and the Department.

The medical branch of the Factories Department is staffed by a senior medical officer, seven assistant medical officers, and a number of inspectors.

The whole country is divided into twelve areas for the purpose of factories supervision, and a superintendent with a small inspectorial staff in each division is responsible to the Chief Inspector of Factories in London. The divisions are further subdivided into districts, each controlled by an inspector. The work in the districts is largely autonomous, but each district inspector is responsible to the divisional superintendent. In each division the technical experts, such as physicians, electricians and engineers, act in an advisory capacity to the superintendent, and they are available to assist any district inspector in the division.

Examination of Employees.

There are throughout the country 1,700 part-time factory certifying surgeons, appointed by the Chief Inspector of Factories to examine certain groups of employees. The scope of the duties of certifying surgeons and the rates of remuneration, on a "piece-work" basis, are prescribed by regulations.

All persons under sixteen years of age working in factories must be examined within seven days of beginning employment. In 1933, 283,328 young persons between the ages of fourteen and sixteen years were examined for medical fitness. For many years school medical officers and certifying factory surgeons have been encouraged to cooperate to the fullest possible extent in the interests of young persons entering upon factory employment. The information about a young prospective employee obtained by medical examinations during the school years may be of great value when the question of industrial employment is being considered.

Persons engaged in certain dangerous trades must be examined periodically. For instance, employees in accumulator factories are required by regulation to be examined once a month. Except in this and some other special cases, the *Factories Act* does not require the medical examination of young persons subsequent to entrance into industry.

The certifying surgeons inquire into special cases referred to them by inspectors, and also make examinations in connexion with workmen's compensation cases.

The medical officers of the Factories Department have formed the impression that on the whole industrial employment does not affect the workers adversely. More precise information would be obtainable on this point if workers were reexamined from time to time subsequent to their entrance upon factory work. Much attention has been given to the effect of industrial work on the health of the women; the general impression is that no definite ill-effect is noted.

Lead Poisoning and Other Industrial Diseases.

Medical practitioners are required to notify the Chief Inspector of Factories of the occurrence of industrial diseases contracted in any factory or workshop. Poisoning by lead, phosphorus, arsenic, mercury and carbon bisulphide are notifiable in this way, and so is anthrax infection.

Lead poisoning has been the subject of special attention for many years, and the rapid reduction in its incidence is evidence of the efficient work of the Factories Department. In 1900, 1,058 cases were reported; in 1910, the number had fallen to 505 cases; and in 1933, only 168 cases were reported. Electric accumulator works have been a source of danger in recent years. All factories where workers are exposed to the risks of lead poisoning are carefully supervised, and precautions are taken to reduce the risks of absorption.

The ill-effects of dust in quarries, mines and potteries have also been the subject of much investigation, and the conditions leading to silicosis and asbestosis have been carefully studied by departmental officers. Sandblasting—a method used in industry for cleansing surfaces by the forcible application of a stream of abrasive material—has been shown to be highly dangerous, in that it produces a serious form of silicosis in the operators. The substitution of small iron shot for sand has proved helpful in eliminating the danger.

Although it would appear that the supervision of factories from the medical standpoint is very efficient and that the safeguards adopted are satisfactory, it is realized by the department that the introduction of new processes into industry demands perpetual watchfulness to protect the health of the workers. In many of the chemical industries that have sprung up in recent years the hazards are great. Factory certifying surgeons and medical officers of the Factories Department are alert to the dangers and to the possible development of new types of industrial poisoning.

PUBLIC HEALTH EDUCATION.

The main function of the central health departments of various countries is to stimulate and guide local departments in the application of modern methods of public health work. The endeavour is also made to interest private medical practitioners in the work and to gain their full cooperation in all official health activities. The training of medical men wishing to specialize in state medicine, and of nurse-inspectors and sanitary inspectors are other aspects of public health education. Lastly, and of great importance, is the education of the general public in the aims of preventive medicine, and to some extent in the underlying reasons for the various health laws to which they are required to submit. Health departments can achieve their highest aims only when staffed by well trained personnel and when solidly supported by enlightened public opinion.

Instruction and Stimulation of Local Authorities.

The Ministry of Health in England serves to keep local authorities interested in current health problems, especially by helping in the solution of difficulties in their areas. Moreover, the local authorities appear to appreciate the

help and to rely a great deal on the guidance of the Ministry. In other countries similar arrangements exist, the central department leading the way and guiding the local departments.

The Ministry of Health also issues special reports and circulars from time to time on subjects of medical importance. The annual report of the Chief Medical Officer to the Ministry (Sir George Newman) is probably the best review of a country's health status, arrangements and aims published anywhere in the world. Each issue is a fund of information for local authorities and other public health workers.

The Cooperation of Medical Practitioners.

The cooperation of private medical practitioners with health departments is one aspect of public health education of the greatest importance. Health authorities realize the value of this cooperation and strive to attain it by various methods. In Croydon (England), for instance, the medical officer of health sends circular letters to all medical men beginning practice in his area, explaining the arrangements provided by his council. In New York City the health department regards itself as the ethical advertising agent of the practising profession and encourages the public to consult the private practitioners for various special health requirements, such as diphtheria immunization.

Most health departments issue periodical publications for circulation to the medical profession and to the general public. These pamphlets explain and discuss items of public health interest and do a great deal to foster enthusiasm for health work and to promote a better understanding among all concerned. One of the best publications of this type is the quarterly bulletin published by the State of Massachusetts, United States of America. This deals with important health topics in a stimulating and thorough way. Usually each issue of the bulletin is restricted to the discussion of one subject—diphtheria, diabetes and venereal diseases are some of the subjects already dealt with—and the articles are contributed by experts in the various subjects.

Training of Personnel of Health Departments.

Most health authorities in England insist that their medical officers and inspectors should be specially trained in modern public health procedure. The majority of medical officers hold the diploma in public health; the requirements for obtaining this diploma are prescribed by the General Medical Council. Some universities also grant degrees to medical graduates in State medicine and in hygiene; the courses of instruction and the standards for these are similar to the diploma requirements. The Royal Sanitary Institute conducts courses of training for health inspectors, and issues certificates which are officially recognized by most health authorities throughout the world.

In most of the large cities the medical schools of universities provide for post-graduate instruction of young medical men in public health. I was able to see something of the methods of training in the London School of Hygiene and Tropical Medicine, University of London, and in the Edinburgh and Aberdeen Universities. In North America I visited the Harvard School of Hygiene at Boston and the Public Health Department of McGill University, Montreal. In all of these schools I was struck with the high standard of training and with its practical character.

I was fortunate in being able to attend a reception at the London School of Hygiene and Tropical Medicine on June 29, 1934, on the occasion of the incorporation of the Ross Institute in the school. The Earl of Athlone unveiled the Manson tablet and the Ross bust. A comprehensive series of lecturettes and demonstrations was provided, and these gave visitors a good general idea of the nature and scope of the school's work.

In England various associations, the members of which are largely medical officers and health inspectors, perform valuable services. The Society of Medical Officers of Health, the Royal Sanitary Institute, the Royal Institute of Public Health, and the Sanitary Inspectors' Association are active bodies in this respect. By means of journals, regular scientific meetings and annual conferences they spread knowledge of new procedures and promote interest in all aspects of health work. The American Public Health Association performs similar functions in the United States.

The Education of the Public.

Health propaganda is being utilized more and more to educate the people in matters of health. Local authorities in England are permitted to spend money on the publication, within their areas, of information on questions relating to health and disease, on lectures, and on the display of posters.

There are many methods of health propaganda, of which the following are the principal methods in use: (*a*) newspaper publicity, (*b*) other printed propaganda (health journals), (*c*) leaflets, (*d*) posters, (*e*) broadcasting, and (*f*) lectures illustrated by lantern slides or films.

In some countries publicity campaigns are staged from time to time—"health weeks", "baby weeks", and recently, in Boston, United States of America, an "Appendicitis Week". Public meetings, often illustrated by picture films, are sometimes held by health authorities and by various voluntary bodies. The tendency in England is not to depend much on special meetings and "drives", but rather to maintain a high standard of work in the various health departments and to trust to the efficiency of the work to hold the interest and cooperation of the public.

Many health authorities send circular letters to people in their areas on special occasions. On the registration of a birth of an infant, for instance, the City of Montreal Health Department sends a letter to the mother pointing out the essential features of baby welfare and the facilities available for her guidance; subsequently letters are sent on such subjects as care of the teeth, immunization against diphtheria and care of milk and other foodstuffs. The Montreal department also publishes very attractively coloured posters on various health topics.

Health posters, to be effective, must be striking, concise and clear, printed in bold type on a suitable background, and with a good catch-phrase, such as "Death to the Fly Means Life to the Child". There is no doubt that the education of the general public is assisted by the use of such pictorial posters. In England those issued by the People's League of Health, the National Association for the Prevention of Tuberculosis, the Health and Cleanliness Council, and by the Central Council for Health Education are very helpful. The National Tuberculosis Associations of Canada and of the United States are active in those countries.

Most health authorities issue to the public printed leaflets on various health topics. It is in the United States of America that the most extensive use is made of this means of propaganda. Many health departments there print pamphlets on the greatest variety of health topics and distribute them generously throughout their areas. The aim is said to be to "sell health".

Health journals are very popular in most countries. *Better Health*, the official monthly journal of the Central Council for Health Education (England), has a circulation of a quarter of a million. Many local authorities buy large numbers of copies for distribution through welfare centres and schools.

In these various ways the people are informed of the diverse character and great value of public health activities. Increased knowledge of personal hygiene produces its results in better-ordered lives, and interest in community health is promoted. Health publicity pays. It is realized the world over that without the cooperation of the whole community the work of health departments must fall far short of the ideal.

HOSPITALS.

Types of Hospital.

Hospitals are a most important form of medical aid, whether voluntary or official. Provided originally for the sick poor, they have ceased to be thus limited in their

use; and more and more admission to a hospital for treatment is being determined on medical need alone. Special hospitals, such as those used exclusively for mental cases, for infectious diseases, for tuberculosis, and for venereal diseases, are in nearly all countries provided and maintained by municipalities or other public authorities. Hospitals for general, medical and surgical cases may be conducted as: (a) private hospitals or nursing homes, (b) voluntary hospitals, (c) official hospitals, controlled by central governments or by municipalities.

Except for minor illnesses and for convalescence, the small private hospitals and nursing homes are being eliminated in most parts of the world. The demands of medical science in these days for expensive apparatus and equipment cannot be adequately met by small institutions. For many illnesses it is only in large, well endowed institutions that patients can be investigated and treated along modern lines. X ray apparatus, supplies of radium, chemical laboratories, bacteriological and pathological laboratories are all necessary and are all expensive. The cost of maintenance is increased by the continued development of new methods and new apparatus, for it often happens that even the best equipment rapidly becomes obsolete and has to be replaced long before it is actually worn out. Small institutions of limited financial resources are therefore quite unable to supply modern medical needs.

Voluntary hospitals, as the big London teaching schools, have been able to meet the requirements to some extent, but it is noticeable that most of these are today "crying poverty" and making plaintive appeals for financial support by the public. Only by the aid of large endowments, as from the Rockefeller Foundation and similar benefactions, have many of these famous old hospitals managed to exist.

National governments do not play a great part in hospital administration in any of the countries I visited. In Germany, where the universities are controlled by the government, the hospitals attached to the medical teaching schools are conducted by the government, but otherwise most of the hospital accommodation is provided by the municipalities. Most German hospitals are therefore supported out of public funds, but in the larger cities there are some voluntary hospitals conducted by religious bodies.

The present-day trend is an increase in the number and improvement in the status of municipal and government hospitals. The rapid increase of these official hospitals is due chiefly to the inability of voluntary hospitals to meet the increasing demands for hospital treatment, due in turn to the advancement and specialization of medical and surgical skill. In England the local authorities between them provide most of the hospital accommodation; the London County Council, for example, has eight times the bed accommodation of all the voluntary hospitals in London. The *Local Government Act* of 1929 provided for the transfer to the charge of local authorities of the hospitals previously conducted by boards of guardians under the Poor Law administration. Through the medium of its health department each local authority now controls the public hospitals within its area. I formed the impression that this transfer has been highly satisfactory and has effected a great improvement in hospital facilities throughout the country. Local authorities are taking their responsibility in this matter very seriously, and the standard of work done in these hospitals is now quite high. It is interesting to observe the change in the type of patients being treated in these hospitals. Under the Poor Law *régime* the hospitals were mainly homes for the aged and chronically infirm; now they have become well equipped general hospitals of modern type dealing with acute as well as chronic forms of illness.

Registration of Private Hospitals.

Although there is in large towns this increase in municipal hospitals, the smaller towns still have many privately conducted institutions. In England the registration of private hospitals and nursing homes is provided for by the *Nursing Homes Registration Act* of 1927. Local authorities are vested with the power of granting the licences. Inspection is carried out before approval, special attention being given to suitability of building and adequacy of qualified staff for the nature of medical work intended to be carried out. Provision is made for the registration of four types of private hospitals: (i) Acute surgical; provision of proper facilities for operations is required. (ii) Acute medical; accessibility and a quiet locality are the important points here. (iii) Maternity hospitals; proper labour ward accommodation must be provided. (iv) Homes for the aged, infirm and convalescent.

Modern Hospital Buildings.

Whenever opportunity presented itself, I visited new hospital buildings in various countries, and through the great courtesy of superintendents and others in authority I was able to inspect the arrangements and discuss matters of medical interest with officers of the institutions.

One of the most striking of the new hospital buildings in London is the Freemasons' Hospital at Ravenscourt Park. In its construction it demonstrates modern architectural ideas. It cost £343,000 to build and equip. With its park-like environment, attractive gardens, magnificent entrance hall, pleasant lounges for patients, extensive balcony accommodation, and its general air of modernity, solidity and comfort, it far outdistances any of the other hospitals I visited. It has accommodation for 200 patients, mainly of the acute surgical type. The arrangement and equipment of the X ray and physiotherapy departments, and of the operating theatres are ample and excellent. The whole of the furnishing is comfortable and, indeed, lavish. The kitchens and laundry, all resplendent in stainless steel and white paint, occupy the top floor of the building; this arrangement is being commonly adopted in new hospital buildings.

The Martin Luther Hospital in Berlin is a very pleasant and efficient looking institution of simple and plain construction. It is a six-story structure. There also the kitchens and laundries are situated at the top floor. The hospital is conducted by the Lutheran Church and provides for 400 indigent and paying patients.

The large Rudolph Virchow Hospital in Berlin is controlled by the municipality. It provides 2,000 beds and is arranged on the pavilion system. It has its own electric power plant, laundries, kitchen and homes for the staff.

The Beaujon Hospital at Clichy, Paris, is conducted by the Paris City authorities. It is a massive modern structure of nine stories, the largest building in Paris. It is a general hospital of 1,000 beds, and each department occupies one or more floors. The roof is reserved for tuberculous and other patients needing unobstructed sunlight and open air. The kitchen and laundry arrangements are in the basement.

The group of hospitals associated with the Harvard Medical School at Boston, Massachusetts, is a famous one. Boston City Hospital is controlled by the municipal authorities and has a research institute attached. Massachusetts General and Peter Bent Brigham Hospitals are voluntary, privately endowed institutions, each with a large pay-bed section. The New England Deaconess and the Beth Israel Hospitals are also efficient voluntary hospitals.

At Montreal, Canada, there are two large hospitals. The Montreal General Hospital is municipally conducted; the Royal Victoria is a voluntary hospital. I was present in September, 1934, at the official opening of the fine new building for the Neurological Institute associated with the McGill University, Montreal.

New York has many fine hospital buildings. The latest to be opened is the New York Hospital, associated with the Cornell University (New York) Medical School. Near at hand is the lavishly equipped Research Hospital of the Rockefeller Foundation.

The Los Angeles County Hospital, now the largest hospital building in the world, was built for the Los Angeles County Council. It is a seventeen-story building and it is designed to provide 3,500 beds.

Hospital Finance.

In recent years a great change has occurred in the hospital situation. The essential fact is that hospitals have ceased in a large measure to be charitable institutions. Long ago the new movement began, when employers made substantial contributions and, in return, received hospital treatment for their employees more or less as a right. Later, workers' contributions have been made on a similar basis. The practice of contributing while well a weekly sum which gives some claim to hospital treatment when needed, has grown very rapidly. The Hospital Savings Association in England works on this plan. Such contributory schemes provide only for part of the expense of treatment; the balance is supplied by endowments, public subscription or taxation.

The voluntary hospitals in the London area receive much financial aid through the King Edward VII Fund. This fund has a large endowment; it receives large amounts of contributions and distributes the money to the hospitals on a basis decided by the council of the fund, and depending mainly on the need and on the character of the work being done.

Hospital provision in England and most other countries is paid for largely out of charitable funds or from taxation or both. The voluntary hospitals and the general hospitals conducted by local authorities usually charge fees varying in amount according to each patient's ability to pay. The official infectious diseases hospitals make no charge, either to patients or their families.

In the United States of America most of the large hospitals are divided into two sections: (i) Public wards. In these the patients are expected to pay fees for hospital service according to their means. The medical attendance to patients in public wards is provided without charge by an honorary visiting staff. (ii) Private accommodation or "pay-beds", with payment for hospital treatment and for medical attendance, as in an ordinary private hospital. Some American hospitals have received special endowments, enabling them to provide intermediate wards of the private hospital type with reduced hospital and medical fees. The Baker Clinic associated with the Massachusetts General Hospital provides such intermediate accommodation.

The question of the payment of medical staffs is much discussed in many countries. The visiting staffs of voluntary hospitals in Britain are unpaid, and as a rule only the junior resident staffs are paid. In the official hospitals both resident and visiting staffs are paid for their service. At Bradford, England, the large General Hospital of the City Health Department has a paid medical staff; there is also a visiting consultant and specialist staff, the members of which are each paid £500 *per annum*. Woodend Hospital, of the Aberdeen (Scotland) Health Department, has general and tuberculosis sections, with a paid resident staff; there is also an honorary staff of surgeons and physicians, each receiving an honorarium of £200 *per annum*.

In Germany the hospital doctors are salaried and devote their whole time to their duties; they do not engage in private practice.

The trend is thus in the direction of more official hospitals, with arrangements for payment of medical officers. According to Sir Arthur Newsholme, "there should be frank acceptance of the principle of payment to the honorary staffs of hospitals". There is without doubt a great transition taking place in hospital arrangements throughout the world. Voluntary hospitals, and the system of honorary medical service that developed with them, appear alike to be rapidly suffering replacement by official hospitals with paid staffs.

Other Public Health Activities.

National Health Insurance.

A national scheme for insurance of working people against sickness and accident was initiated in Germany in 1883, when the first act on sickness insurance was passed by the Reichstag. In subsequent years the number of classes insured was steadily increased and benefits were enlarged. In 1911 the acts relating to insurance against sickness, invalidity and accident were incorporated in a single federal insurance code. Medical attendance is commonly given to the dependants of insured, as well as to the insured, and it includes hospital treatment and the service of specialists.

National health insurance has now been in operation in Great Britain for over twenty years. It is conducted on similar lines to the German scheme, but the medical practitioners are paid on a capitation basis; in most parts of Germany payment is based on actual services, although in Berlin payment is *per capita*, as in Great Britain. At its inception the British scheme was opposed by a large proportion of the medical men, largely on account of the capitation basis of payment. Time, however, has shown the wisdom of the arrangement. In 1933, the year of coming of age of the insurance service, much was said on suitable occasions by public men who had been concerned actively with it. There was remarkable unanimity in praise of what the service had accomplished. It was agreed that the medical service provided for the insured population of England was vastly superior to that given to the same class of people before the introduction of national health insurance, and that improvement since its inception had been steady and continuous.

National insurance in Great Britain is mainly a general practitioner service of enormous extent, engaging 16,500 practitioners in England and Wales, and entitling 16,000,000 people to medical benefit. Two-thirds of the doctors in Britain do panel work, and two-fifths of the population are provided for. The service is financed by contributions from employees, employers and the government.

I sought the views of many people, medical men and others, and it was generally agreed that the service is a satisfactory one. Medical men, who at first opposed and feared the scheme, are now working happily under it. I think that during the recent period of economic stress national insurance has been of inestimable benefit to the insured people and to the medical men of the country.

In some quarters it is contended that the national health insurance scheme should be coupled with a more vigorous public health programme, to insure the absolute minimum of preventible illness. Such items as extensive health propaganda, strict enforcement of all public health measures, periodical medical examinations of every individual, and comprehensive registration of sickness are considered desirable adjuncts. It is claimed that these measures are essential in a complete scheme and that the logical thing is to regard health insurance as a measure to alleviate the burden of residual sickness which the public health programme fails to prevent.

Other European countries have introduced insurance schemes, some on a voluntary basis, but most on the compulsory basis, as existing in Britain and Germany. In Canada and in some of the States of America the introduction of national health insurance is being seriously considered at the present time.

Child Welfare.

Notification of births to local authorities within thirty-six hours is a legal requirement in England and in most other countries. The Health Section of the League of Nations has been active in inducing countries to provide for early notification of births as a first step in efforts to reduce infantile mortality. The problems of infant care and of the causation and prevention of neo-natal deaths are being assiduously studied all over the world.

In England over 2,000 infant welfare centres are conducted by local authorities, and nearly 1,000 by voluntary committees. The work is essentially the same as that being done at the baby clinics of the Mothers' and Babies' Health Association in our State.

More attention than formerly is now being given to children between the ages of two to five years. Many local authorities in Britain provide clinics for these "toddlers" or pre-school children. The Borough of St. Marylebone (London) conducts such a clinic under the direction of Dr. Charles Porter, the medical officer of

health, and Dr. W. Allen Bulman, the assistant medical officer. In 1933 there were in England 82 day nurseries provided by voluntary associations and 18 by local authorities. Much good work is done in thus providing for the shelter and care of healthy young children whose home circumstances do not provide wholesome conditions of living, and primarily for those whose mothers go out to work.

A large number of child guidance clinics are springing up in England, especially in the large centres. These are voluntary clinics, under the direction of the Child Guidance Council. Physicians and psychologists attend the clinics, and are consulted by parents regarding difficult children. Advice is given on the educational and other problems arising in the training of children. Vocational guidance is an important feature of the work.

At Boston, United States of America, a day nursery is incorporated with each health centre. A trained nurse is in charge of the arrangements and splendid playroom is provided for the young children.

Maternity Welfare.

In England there are over 1,000 ante-natal clinics provided and maintained by local authorities, and about 300 clinics organized by voluntary associations. The clinics perform similar duties to those of the Mothers and Babies' Health Association in South Australia.

It is noted that in England the graph for puerperal mortality is still slightly in the ascendant. The 1933 figure of 4·51 maternal deaths from all puerperal causes per 1,000 live births registered is the highest recorded in the last twenty years. (In 1932 in South Australia the rate was 5·17, and for the whole of Australia 5·57. Figures as low as 2·6 are recorded in some countries.) It is observed by the Ministry of Health that the high maternal death rate is not shown in all the districts, but that certain areas are chiefly responsible. Sir George Newman is endeavouring to stimulate the authorities responsible for the health administration of these high-mortality districts to greater activity in maternity welfare work. It would appear that, where ante-natal clinics are provided, they are not sufficiently used and that ante-natal supervision (according to Sir George Newman) in clinics in hospitals and private practice is at present in many cases perfunctory, unskilled or not complete.

Better Housing.

The British Government is making vigorous efforts to improve housing conditions in Britain. The *Housing Act* of 1930 is the most progressive measure on the statute book for the abolition and prevention of slums.

The Minister of Health, the Right Honourable Sir Hilton Young, reviewed the whole matter in an address before the Health Congress of the Royal Sanitary Institute at Bristol in July, 1934. He said, *inter alia*, that "we have an enormous legacy of mischief and evil from the past—practically two hundred years of mistakes and imperfections to make good . . . . In order to get slums cleared we are including provisions as regards compensation in respect of slum houses which are stringent, although they are just."

There is much building activity throughout Britain. By private enterprise houses are being built, according to Sir Hilton Young, "at the unexampled and unexpected rate of 240,000 a year". Slum buildings, declared unfit for human habitation, are being destroyed and decent new houses are being substituted.

The work of slum clearance and new housing provision is being dealt with by local authorities in a businesslike manner. The Ministry of Health is acting as the central coordinating authority for the official schemes. I was struck with the whole-hearted enthusiasm throughout England and Scotland in the endeavour to provide better housing for the poor. In Scotland in 1933, for instance, over 20,000 new houses had been provided by official schemes. The importance of good housing as a basic requirement for national efficiency seems now to have been realized.

Summary and Conclusions.

The Widening Field of Public Health Work.

A big change is taking place in medicine; from being an art of observation and empiricism, it is becoming an applied science founded upon research. Medical research—the painstaking scientific investigation into the problems of disease—is being actively pursued throughout the world. Much new knowledge is being gained and is gradually being applied in the everyday lives of the people.

Medicine in its preventive aspects is a particularly live subject today, and the scope of public health and preventive medicine has been considerably extended. Not many years ago preventive medicine was exclusively concerned with "drains and stinks" and quarantine. This era has passed. The idea that all disease, whether infectious or not, is of serious national concern has now become accepted by statesmen in every country. Sir George Newman expressed the matter very well when he said:

> The enemy to be destroyed in England is not now, as in old days, the pestilences coming whence no man knew—leprosy, plague, ague, sweating sickness, typhus, and scurvy. Their place has been taken by heart disease, diseases of the lung, cancer, impairment of the nervous system, digestive disorders and tuberculosis—all of them, excepting cancer, morbid conditions intimately related to the industrial, social and personal life of the people. Of the origin of cancer we still know next to nothing, but the others we can track down and often demonstrate their social causation.

Yet sanitation is still the basis of public health work and the control of infectious diseases still zealously to be sought. But there is much more to do. Proper supervision of food and water supplies, the care and protection of motherhood, the reduction of infant mortality, the health and physique of the growing child, improved personal living, the health of the worker in the workshop, the prevention and treatment of all diseases (infectious and non-infectious alike), better education of the people in health matters: such are the aims of present-day public health services.

In this report I have dealt only with those features of public health work into which I was able to make detailed inquiry during my visit to other countries. On some important aspects of health work, mental hygiene for example, I have made practically no comment, nor have I referred to such important matters as sanitary engineering, sewage disposal and water supplies. It will be agreed, however, that I have acquired a good deal of information on those aspects of the work in which active progress is being made at the present time, and workers in our own State may derive some interest and benefit from what I have set down.

Increasing Expenditure on Health.

It is obvious that in all countries public health work is receiving more and more attention and that an increased amount of money is being spent upon what may be termed official medicine. Government departments of health now occupy a very important place in administration in every country. "Better Health for the People" is a world slogan. In England during the last twenty years the expenditure for health work by the Ministry of Health and the local authorities has increased tremendously. It is difficult, however, to compare the expenditure of one country with that of another; in every country the departmental arrangements differ and a basis of comparison cannot be easily found. Moreover, the need for such expenditure in some countries is much greater than in others. Climatic conditions play a part. Tropical countries, for instance, are burdened with a number of diseases not common to temperate climes, and the control of these diseases costs money. The type of population also plays a part. With people well educated in matters of personal hygiene the need for government supervision and assistance may not be so great. In some countries, too, voluntary associations undertake a large amount of public health work and thus relieve the financial burden on official departments.

Australia is naturally a healthy country. Our climatic conditions are good, so-called "tropical diseases" rarely trouble us, and we are free from many difficulties that arise in countries of mixed populations. For these reasons the need for spending money on public health work may not be so great as in some other countries. Whatever the need and whatever the reasons, the fact remains that on the whole our public health activities in South Australia are less extensive than elsewhere. As the ideals of modern preventive medicine are accepted by governments, there will be developments similar to those in other countries. The experience I have gained in studying the activities of health departments abroad will greatly assist in the administration of our own health department, and especially in developing our work along progressive lines.

Lines of Development.

As has been noted in an earlier portion of this report, the basis of our organization is similar to that in Great Britain, and I think there is no doubt that the advances made there will be followed to an increasing extent here in Australia. Many modifications will be necessary, however, for the arrangements suitable to large cities and densely populated centres will be hardly applicable to our country areas.

With the increasing scope of official medicine it is inevitable that expenditure in this field will be increased in our State. Whether the funds are provided by the government or by municipal or district councils is not material from the medical standpoint, but is rather a matter of administrative arrangement. Since the health of the people is a circumstance of national as well as local importance, it would seem appropriate for the expenses to be shared by central and local bodies. It may be found desirable, as was the case in Great Britain, for the government to make financial grants to local boards of health to assist them in developing their work.

An outstanding difficulty in our State is that we have too many local boards; the population within the area of each is too small to warrant the maintenance of a satisfactory health department or centre, and in any case the financial resources of each area are too limited. The experience of most countries is that for a public health centre to work efficiently and economically, it is necessary to have a population in the area of at least 75,000. On that basis this State would be provided with about eight health centres. Contrast this with the present situation, where we have 167 local boards, each with its health work to do. The service would be more efficient if numbers of adjacent local boards were to combine their activities. Provision exists in our legislation for such arrangements, and such bodies as the Metropolitan County Board and the East Torrens County Board are examples of the fusion of local boards for purposes of health administration.

In selecting the personnel for health work due regard must be paid to their fitness for the work. So specialized has the public health work become that it is desirable for those directing it to be adequately trained. Sanitary inspectors and nurse-inspectors should also be trained in the special features of the work.

As official medicine in our State grows in importance, the practice of employing officers of health on a part-time basis will doubtless gradually be replaced by a whole-time service. Only by local boards combining to form health districts of greater population and revenue will it be possible to maintain such a service. A suitable beginning might be made, especially in country districts, by adjacent local boards combining to employ a whole-time sanitary inspector to supervise general sanitation in their areas.

Much valuable public health work is being done in our State by voluntary bodies, such as the Mothers' and Babies' Health Association. As long as the work of such voluntary bodies is continued in an efficient manner, it is neither necessary nor desirable that official bodies should take it over. It is the better plan to foster voluntary activity as much as possible. It should be a principle, however, that where money is being supplied out of government revenue to assist the work of voluntary organizations, there should be government representation on the committees or boards of management of these subsidized bodies.

Above all, official medicine must foster the cooperation of the practising medical profession in public health work. There is no need for antagonism; the interests of the State in the health of its citizens need not conflict with the interests of private medical practitioners. In some cities official activities are brought into intimate contact with the work of medical teaching schools associated with universities. In the medical curriculum preventive medicine now holds an important place and the young graduate is ready to play his part in the practical application of it. This happy liaison between official medicine and active medical study and practice is vital to progress.

The welfare of any community depends so largely on the health of its members that no effort should be spared to gain the desired goal. Health, happiness and prosperity are just as interwoven, just as interdependent, in the affairs of nations as of individuals. Every citizen has duties here, for a public health service can be effective only if it is received and practised by enlightened citizens. The health of a nation, its happiness and its prosperity rest on the acceptance of the aims and aspirations of preventive medicine.

Medical Societies.

THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA.

A MEETING OF THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA was held at the University of Adelaide on November 3, 1933.

Boomerang Legs.

DR. C. J. HACKETT discussed the ætiology of "boomerang legs". It was defined as a forward bowing, with some flattening, of the tibiæ (one or both), and in marked cases it might be associated with deformity of the ulnæ.

Referring to Stirling's (1894) first note of the condition and his reference to it in the Horn Expedition Reports (1896), it was remarked that his suggested name of "campticnemia" was more applicable than either "boomerang leg" or "platycnemia".

The distribution of the deformity was stated to be over the northern part of Australia and the adjacent islands and the New Hebrides. From the last area cases in European children had been reported by Gardner (1905).

Up to the present the suggested causes of this condition had been syphilis, dietetic deficiencies or a racial characteristic. This last explanation was due perhaps to confusion brought about by the use of the term "platycnemia".

Emphasis was laid on the value of the article by Breinl and Priestly (1915). Cases seen during an expedition this year into the north-western part of South Australia were next discussed. These could be summarized under the following heads:

1. Occasional, often single, scabs not obviously of traumatic origin.
2. More extensive, usually linear, scabs associated with joint and bony disease.
3. Cases with the above active disease, dermal or bony, and with deformed tibiæ.
4. Extensive linear scabs, bony lesions and a gangosa-like condition of the nose and upper lip.
5. Finally, in older natives, definite camptocnemia with apparently good health, who, on closer examination, revealed evidence of an earlier granulomatous condition in certain faint but definite skin changes, or scars on the neck, in the anticubital fossa or groin.

It was suggested that some factor capable of producing a granulomatous and scabbed condition occurring in childhood led to the development of "boomerang legs", and if the subject survived, the traces of the previous lesions became insignificant. As over most of the area in which

camptocnemia occurred yaws was present, and because of the suggestive character of the skin and some of the bony lesions, it was finally put forward that this factor was the *Treponema pertenue* of frambœsia.

DR. L. BULL said that the pathology suggested an infection and closely resembled that of syphilis.

PROFESSOR J. A. PRESCOTT gave an account of his impressions of peg-leg disease of cattle obtained during a recent visit to the pastoral areas of Queensland. He said that this disease, which was very similar to diseases caused by phosphorus deficiency in South Africa, was fairly common in the pastoral country between Charters Towers and the Gulf of Carpentaria; it was more frequent on certain soil formations than on others, and appeared to be most common in the sandy "forest" country immediately north of Mitchell grass downs of the far west.

Experiments on the use of phosphatic supplements were being carried out at Helenslee station by the Townsville Research Station with remarkable results, where dicalcic phosphate was spoon-fed to stock every second day. It was evident that the supply of phosphate either improved the appetite of the cattle or enabled them to make better use of the feed that they ingested. A serious practical problem would be to insure that bush cattle duly received the supplement, possibly best supplied in the drinking water.

The relationship of the disease to the seasonal (monsoonal) character of the rainfall and the size of paddocks in relation to the scattered character of early and late thunderstorms was commented upon.

In conclusion, Professor Prescott called attention to the difficulty in separating protein deficiency from phosphorus deficiency in pasture analyses, and demonstrated graphs showing the nitrogen-phosphorus ratios of various grasses and clovers at different stages of growth.

MEDICAL WOMEN'S SOCIETY OF NEW SOUTH WALES.

THE ANNUAL MEETING OF THE MEDICAL WOMEN'S SOCIETY OF NEW SOUTH WALES was held at British Medical Association House, 137, Macquarie Street, on April 3, 1935.

Annual Report and Financial Statement.

The annual report and financial statement were adopted. The report is as follows.

The Committee submits the following report:

Membership.—The financial membership stands at 69.

Meetings.—In accordance with the rules of the Society, four quarterly meetings were held during the year. At the June meeting two films were shown: "The Technique of Blood Transfusion", which was presented by Dr. E. Stokes, who gave a short address outlining the salient features of the apparatus used in the film; "Cervical Cæsarean Section" (Dr. Lee).

In September a clinical evening was held at the Rachel Forster Hospital and the following cases were shown and discussed: Two cases of atresia of the vagina, Dr. C. E. D'Arcy; uterine hæmorrhage associated with puberty, Dr. I. Saunders; abdominal tumour, Dr. M. Farrar; thyreotoxicosis complicating pregnancy, hydronephrosis following obstruction of ureter, varicose ulcer undergoing treatment, Dr. K. Cunningham; results of treatment in two cases of double antral infection, Dr. B. Laws; case of cardiovascular syphilis, case of "Novarsenobenzol" purpura, Dr. A. Walker; case of neurosyphilis after malaria therapy, Dr. I. Sebire; demonstration of radium colpostat, Dr. S. Bray.

Addresses and Papers.—At the annual general meeting in March, 1934, Dr. Karen Helms read a paper entitled "Contraception from its Medical Aspect". Her address formed a comprehensive scientific and practical survey of the subject.

Social Meetings.—The annual dinner of the Society was held on December 5 at The Women's Club, with an attendance of 45 members.

Office-Bearers.

The office-bearers elected for 1935 are as follows:

President: Dr. Marjorie Little.
Vice-Presidents: Dr. C. D'Arcy and Dr. I. Saunders.
Honorary Treasurer: Dr. A. Aitken.
Honorary Secretary: Dr. P. M. Anderson.
Members of Committee: Dr. I. Sebire, Dr. E. Sandford-Morgan, Dr. A. Walker, Dr. M. E. Edelsten-Pope, Dr. R. Heighway, Dr. T. Carmichael, Dr. M. Hamilton.

Malignant Tumours of the Ovary.

Dr. C. D'Arcy read a paper on malignant tumours of the ovary, their classification and treatment by surgery and X radiation.

The pathology of malignant ovarian tumours was discussed and illustrated with diagrams by Dr. M. Little.

A vote of thanks was proposed by Dr. M. Harper and seconded by Dr. I. Saunders.

MELBOURNE PÆDIATRIC SOCIETY.

THE first meeting of the Melbourne Pædiatric Society for the year 1935 was held at the Children's Hospital, Carlton, on Wednesday, April 10. DR. J. G. WHITAKER was elected President for the ensuing year, and at the conclusion of business the following cases were presented.

Hypospadias.

DR. H. DOUGLAS STEPHENS showed a boy of nine years with a perineo-scrotal type of hypospadias on whom he had performed the three-stage operation for repair of the defect devised by Edmunds and described in *The Lancet* of February 13, 1926. The urethra opened at the root of the scrotum and the penis was short and markedly curved. The first stage was to make a buttonhole in the preputial hood. Three months later the second stage was to straighten and elongate the penis. Then, three months later still, the third stage was the reconstruction of the urethra. It was lined by skin and not epithelium. The bladder was not opened at all. In this case, although the boy pulled his catheter out, it fortunately did no harm, and he now passed his urine normally, except for the slightest moisture which appeared through a stitch opening at the side of the track. Dr. Stephens said that he showed the patient to draw attention to Edmunds's method because the results of this operation were so satisfactory.

Chronic Arachnoiditis.

DR. J. W. GRIEVE showed a girl of five years with the history that six months previously, in the country, she had an acute illness of sudden onset with fever, headache, drowsiness and irritability. After ten days, lumbar puncture was performed and the fluid was said to be clear, but under increased pressure, and to contain some polymorphonuclear cells, but no organisms. Apart from slight weakness of the left side of the face there were no abnormal physical signs. The child recovered sufficiently in a month to be able to walk about, but some weakness was observed on the left side of the body. Two months after the onset she had a convulsion, but thereafter her condition improved for a while, although the weakness of the left side was still evident. Four months after the onset she had an attack of headache, vomiting, drowsiness and irritability which lasted for ten days, but then she improved till sixteen days before admission to hospital, when headache and vomiting recurred. On the day of admission she had another convulsion, and since then she had steadily become worse. She was drowsy and lay curled up on the right side. She had slight bilateral papillœdema with slight ptosis and facial paresis on the left side. Examination otherwise revealed no definite abnormality. The cerebro-spinal fluid was still macroscopically clear and under increased pressure, but globulin was present and there were forty lymphocytes per cubic millimetre. Dr. Grieve thought that the original illness

was either an encephalitis or a meningitis with a subsequent adhesive arachnoiditis and internal hydrocephalus.

DR. ROBERT SOUTHBY said that the onset with fever, meningeal irritation, and the presence of polymorphonuclear cells in the cerebro-spinal fluid indicated an infection, and he suggested a low grade meningococcal meningitis. Frequently the organism could not be recovered in these cases and they gradually passed into the condition of increasing hydrocephalus, as this girl appeared to be doing.

DR. H. C. COLVILLE quoted a similar case of an infective meningitis passing on to a condition of hydrocephalus on which he had operated, the preoperative diagnosis being a cerebellar tumour. At operation there was no tumour, but a pure basal arachnoiditis, the posterior fossa being filled with fine adhesions and the cerebellum being herniated into the *foramen magnum* by the pressure of the internal hydrocephalus. This child had papillœdema and other signs of greatly increased intracranial pressure, but after the adhesions were divided there was a free escape of cerebro-spinal fluid and ultimate recovery ensued. He thought, therefore, that if Dr. Grieve were reasonably sure that this was a case of basal arachnoiditis, the patient should be operated upon.

Tetanus.

Dr. Grieve next showed a boy of three and a half years, admitted to hospital from the country with a history, commencing sixteen days previously, of waking at night and crying as if in pain. Two days later his jaw seemed a little stiff and he talked through his teeth. Two days later still a small burr was removed from an infected wound in his left heel. From then on he cried much more during the night, apparently in pain, and he began to stumble occasionally during the day and his gait became stiff and awkward. On admission to hospital his condition was typical of tetanus, with stiffness and spasms of the masseter muscles and of the limbs. He was given antitetanic serum intravenously only, 10,000 units being given every day. He was also given "Sodium amytal", 0·06 gramme (one grain), three times a day, as well as small doses of chloral hydrate and potassium bromide. The first night in hospital he had spasms hourly during the night, and when disturbed during the day, but at the time of the meeting he was having no nocturnal spasms and only occasional light spasms when disturbed during the day. Dr. Grieve showed the boy as exemplifying a subacute case of tetanus, noteworthy because of the slow march of the disease, because of the nocturnal predominance of his symptoms, and because of the way he had responded to the intravenous method only of serum introduction.

DR. M. O. KENT HUGHES said that opinions were still divided as to the relative merit of intravenous *versus* intrathecal serum therapy, the clinical results being very similar, and, seeing that ill effects might follow the intrathecal method, in the shape of meningitis, he thought it preferable to give the serum by the intravenous route only.

In this latter regard, Dr. Ian Wood said that he had seen an autopsy in a case of tetanus treated by intrathecal medication, and the appearance of the brain was exactly similar to a recent meningitis. He, too, thought the intravenous route preferable.

Obituary.

JOHN FRANCIS WILKINSON.

DR. JOHN FRANCIS WILKINSON, whose death has been recorded in this journal, was the eldest son of the late William Wilkinson. He was born at Collingwood, Victoria, on April 13, 1864. His early education was undertaken at Boston's Grammar School, Preston, and at Carlton College during the *régime* of Alexander Sutherland. He was *dux* of his school. Deciding upon medicine as a career, he entered the medical school at the University of Melbourne in 1880. He was a successful student and won several prizes and exhibitions during his course. Moreover, he was a keen cricketer and had a reputation as being a first class fieldsman at point. He was appointed to the Melbourne Hospital as a resident medical officer; subsequently he joined the honorary medical staff and became an in-patient physician. His private practice was first of all situated at Bright, and he later travelled abroad for post-graduate study. In 1897 he commenced practice in Collins Street. He was particularly interested in diabetes and gastric diseases. He was a friend of this journal and some years ago was a constant reviewer of books on these subjects. For several years he was a member of the Council of the Victorian Branch of the British Medical Association and held office as its president. He was an honorary lecturer at the University of Melbourne in physiological chemistry, and was one of the first practitioners to establish a private laboratory.

During the War Wilkinson gave up much of his time to home service, holding the rank of Honorary Major in the Australian Army Medical Corps Reserve. He served the University of Melbourne for many years as a member of its Council. He also gave post-graduate lectures for the Victorian Branch of the British Medical Association.

Apart from medicine, Wilkinson was interested in the tract of Victorian country known as the Buffalo. He was the first Secretary of the Alpine Club. With Edward Carlile he opened up the first tracks of the Buffalo country. His name is associated with some of the chief landmarks of that district. He paid almost sixty visits to the Buffalo and seldom failed to go there every year. He wrote a booklet entitled "The Romance of the Buffalo". He seldom missed a cricket match at the Melbourne Cricket Club ground. He was a leading layman of the Methodist Church in Victoria, was a member of fifteen conference committees and also a member of the General Conference of Australasia. He was a member of the Council of Queen's College and of Wesley College.

He leaves a widow and three sons, to whom the heartfelt sympathy of the medical profession is extended in their bereavement.

Dr. Felix Meyer writes:

Fifty years ago John Francis Wilkinson came as a student to the Melbourne Lying-in Hospital (now the Women's Hospital), where I was resident medical officer. The ability, earnestness and thoroughness of the student foreshadowed the future outstanding physician. With our meeting some years later at a test match at Lords and soon after at the annual British Medical Association meeting at Newcastle-on-Tyne began a friendship which ended only with his passing, one that has meant much to me. He was for me, as for others, a very present help in time of suffering. It is for others to speak of him as physician, clinician, lecturer and man of research. Essentially a physician, he had the surgical mind that meets the surgeon half way in his diagnosis, and he was an ideal anæsthetist. To say of him that he saw life steadily and saw it whole is to epitomize a man of vision who fulfilled himself in many ways. He read much, he travelled much; art made a great appeal to him, Nature a greater; and he was a very happy man roaming and climbing about the Buffalo country he loved so well and for which he did so much. Working with Edward Carlile, a cattleman, he opened up the first tracks, and his name and those of members of his family are perpetuated in some of the chief landmarks. We have had many delightful tramps on the Buffalo; he knew every peak and crag and gorge, and his energy and enthusiasm were those of a man ten years younger. He was a man of deep religious feeling, loyal and generous to his church, broad in his views, and tolerant, and actively interested in church matters. He was a councillor of Queen's and Wesley Colleges. Sturdy of body, with a kind and gentle nature, he moved with dignity among his colleagues. To know him was to like him greatly, to value his professional wisdom, to admire

his high ethical code. His family life was ideal. He brought honour to his profession, and his name takes its place among our great physicians.

Professor W. A. Osborne writes:

My first experience of Dr. J. F. Wilkinson was typical of the man. I arrived in Melbourne in March, 1904, to take up the duties of the Chair of Physiology. There was no formal introduction to my classes or to my colleagues; there was no inaugural lecture—I had actually prepared one; I was expected to find out for myself how my department worked. It was then that Dr. Wilkinson came forward, introduced me to my first audience of students in a kindly speech, then piloted me through the various practical classes and then worked untiringly as a demonstrator without fee or reward. I soon realized that Wilkinson was one of those who are endowed with an overflowing energy which must find an outlet in hard work, and also an overflowing kindliness towards his fellows.

He had not the advantage of even a fair training in the fundamentals or the technique of chemistry, but he surmounted this handicap. From Professor (now Sir Charles) Martin he picked up a number of clinical laboratory tests, but he was mostly self-trained. Instead of being frightened by a complicated analytical procedure, he would tackle it again and again until full mastery was achieved. But the method itself was always secondary to the end, namely, the diagnosis of his patient's condition and the indications for treatment. The determinato be up to date and to be accurate, backed up by quick observation and shrewd judgement, led to Dr. Wilkinson becoming the foremost clinical biochemist in Melbourne, and it was he who originated that special feature and special strength of the Physiology Department in the Melbourne Medical School, the class in clinical biochemistry. His early lack of experience in a laboratory devoted to investigation as well as routine instruction led to his one failing, an insufficient sympathy with research students. In this attitude he was no doubt following the example of his hero, Sir Harry Allen, who did not himself conduct or direct research and who taught a generation of Melbourne doctors to be destructively critical regarding such. But this is a small spot on the sun's disk.

I wonder whether any pupil of Dr. Wilkinson will gather together the many medical aphorisms which he would freely communicate and which were the outcome of a vast professional experience. Some of these might appear at first to deal with trifles, such as whether a man woke up at 4 a.m. or fell asleep at 4 p.m., but their significance was soon realized. I used to listen with unalloyed pleasure to these simply expressed truths which had the knack of staying in memory.

It is sometimes observed in a biographical notice that the person described was happy in his married life. Such a statement would be inadequate in this case. There was a spiritual communion between husband and wife and an atmosphere of unaffected sanctity in the home, the peace which passeth understanding, which the most casual visitor could not fail to detect. At the fortieth celebration of their wedding day Dr. and Mrs. Wilkinson allowed my wife and myself to join their family party. No other compliment ever paid us do we cherish so highly in remembrance.

Dr. Ivan Maxwell writes:

I regard it a privilege to have been asked to write a few words concerning the work of the late Dr. J. F. Wilkinson, a man whose personality endeared him to everyone and whose teaching was an inspiration to his students.

Quite early in his professional career he recognized the importance of biochemical methods in medicine, and by years of work in an entirely honorary capacity in the Department of Physiology of the University of Melbourne he laid the foundations of the present classes in clinical biochemistry long before this branch of science had been so extensively applied to medical problems as it is at the present time. Dr. Wilkinson had been a keen advocate of methods of chemical investigation in gastro-enterology, in urology and in the problems of diabetes and other disorders involving a special knowledge of metabolism. He was essentially practical in his outlook and made many shrewd observations and suggestions, as illustrated by his advocacy a quarter of a century ago of massive doses of iron in the treatment of what is now classified as microcytic anæmia, a form of therapy which in this disease has only recently won widespread recognition. His extensive use of the test meal and gastric analysis enabled him to recognize the frequency of achlorhydria in the community and the necessity of correcting this condition therapeutically. Indeed, his knowledge of therapeutics was very profound and of inestimable value in the teaching of students. It is interesting to reflect that Dr. Wilkinson witnessed during his lifetime the growth of clinical biochemistry from simple beginnings to a science whose ramifications now extend to every branch of medicine. One is proud to think that he contributed in no small measure to this consummation by his ability to link the work of the laboratory with his own clinical observations. It was with the deepest regret that I heard of the passing of a life so full of achievement.

Dr. H. M. Hewlett writes:

My association with J. F. Wilkinson first began in 1897, shortly after he came to Melbourne from Bright. He gave post-graduate courses on gastric analysis, hæmatology and urinary analysis. These practical lectures were largely attended and were the beginning of the modern scientific methods now used.

I well remember when doing gastric analysis he wanted us to put the stomach tube on each other, and that was in the days of the large tube, before the pleasant little one now used in fractional tests.

Shortly after these lectures I did my first gastric X ray examination for him. I cannot call it an opaque meal examination, as it was long before those were made use of. It was the case of a stout man with a non-obstructive dilatation of the stomach, and J. F. Wilkinson was anxious to know its size. We gave him a large bismuth-filled gelatine capsule to swallow and then screened him with my six-inch coil. With strong imagination we could make out on the screen the shadow of the capsule, and as it was extremely low we assumed the diagnosis was correct.

This was the beginning of my long association with him in gastro-intestinal radiology. Very often he would bring along five or six cases at a time about 8.30 and see them again later in the day. He would often be seen walking down Collins Street with his eyes shut, tapping along like a blind man, so as to save time getting his eyes ready.

I had a trip to Mount Buffalo Plateau with him one year, and it was most enjoyable. He was an excellent guide and knew all the interesting places. I think it was largely due to him Buffalo became so popular, and there is a spot there called "Wilkinson's Look-Out".

He was a loyal, true friend, and we all deeply sympathize with Mrs. Wilkinson and the family.

STELLA BRADLAUGH SYMES.

DR. STELLA BRADLAUGH SYMES whose tragic death has been recorded in these pages, was born at Brunswick, Victoria. She graduated as Bachelor of Medicine and Bachelor of Surgery at the University of Melbourne in 1925. After graduation she held resident appointments at the Mooroopna Hospital, the Queen Victoria Hospital and the Janefield Sanatorium. Subsequently she took up practice in Collins Street, Melbourne, specializing in gynæcology and venereal diseases. She acted as honorary medical officer to out-patients at the Queen Victoria Hospital, Melbourne. She lived with her aged mother and died as a result of burns received while trying to save her mother from her home, which had caught fire accidentally. It has been said of her that her first thought was always for others; she had a sympathetic and gentle nature. She endeared herself to a wide circle of friends and acquaintances.

Correspondence.

TUBERCULOSIS AND MENTAL HOSPITALS.

SIR: In your editorial of this week's journal, on the mental hospitals of New South Wales, there appears a quotation from the annual report of the Inspector-General, which cannot go unchallenged. It appears that Dr. C. A. Hogg has stated in his report that: "Out of 23 nurses so far ascertained by the Director of the Tuberculosis Division who have been infected in hospitals throughout the State generally, no less than eight have come from mental hospitals." This is a serious misstatement, which should be corrected forthwith, and to the correction of which widespread publicity should be given.

What Dr. Hogg meant was that twenty-three nurses have become affected with pulmonary tuberculosis while on the staff of hospitals in New South Wales. To state that they "have been infected in hospitals" is quite another matter.

It is an accepted fact that in the great majority of sufferers from pulmonary tuberculosis infection has occurred during early life and that the disease as we see it in adults is the result of stresses such as overwork, under-nutrition, worry, other infections and the like, which have undermined the patient's resistance to their pre-existing infection.

From personal contact with a number of these twenty-three nurses I can affirm that they conform to the above, with few exceptions; in other words, that they have not been infected in the hospitals. Considerable prominence has been given recently in the public Press to the question of infection of nurses, and the general impression appears to be in accord with Dr. Hogg's report. It is desirable that this error should be corrected as soon as possible, both for the sake of nurses who may fear a danger which, with ordinary care and cleanliness, is non-existent, and of patients whose lot will be doubly unfortunate if by any chance adequate nursing staffs cannot be obtained for their institutional care.

It may also be questioned whether, in a survey of many nurses over a considerable period of time (I think ten years) twenty-three cases is an unusually large number. I venture to suggest that the proportion is considerably lower than would be found among such occupations as comtometer operators, dressmakers, and many of the modern trades employing female labour.

It is a recognized fact that in a well conducted institution the danger of infection from tuberculosis is negligible, and let it be established beyond cavil that no other kinds of institutions exist, at least in this State!

Yours, etc.,
COTTER HARVEY.

135, Macquarie Street,
Sydney,
April 30, 1935.

Proceedings of the Australian Medical Boards.

VICTORIA.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Act*, 1928, of Victoria, as duly qualified medical practitioners:

Agar, Wilfred Talbot, M.B., B.S., 1934 (Univ. Melbourne), University Grounds, Melbourne, N.3.

Butcher, Beresford James, M.B., B.S., 1934 (Univ. Melbourne), Melbourne Hospital, Melbourne, C.1.

Laver, Jack Charles, M.B., B.S., 1934 (Univ. Melbourne), 18, Brookman Street, Kalgoorlie, Western Australia.

Mabin, William James Richard, M.B., B.S., 1925 (Univ. Melbourne), Seymour, Victoria.

Macmillan, Hamish, M.B., B.S., 1928 (Univ. Melbourne), 210, Albany Road, Victoria Park, Western Australia.[1]

Panting, Rona May, M.B., B.S., 1934 (Univ. Melbourne), Morton House, Charles Street, Launceston, Tasmania.

Saleh, Michael George, M.B., B.S., 1928 (Univ. Sydney), 238, Latrobe Terrace, Geelong.

Wharton, Joyce Helen Wentworth, M.B., Ch.M., 1926 (Univ. Sydney), Queen Victoria Hospital, Melbourne, C.1.

[1] Hamish Macmillan was formerly known as James Robertson Thomson Macmillan.

Books Received.

BENIGN ENCAPSULATED TUMOURS IN THE LATERAL VENTRICLES OF THE BRAIN: DIAGNOSIS AND TREATMENT, by W. E. Dandy, M.D.; 1934. London: Baillière, Tindall and Cox. Royal 8vo., pp. 197, with 83 illustrations. Price: 20s. net.

THE FUNCTION OF MONEY AND PRODUCTS IN RELATION TO NATIVE DIET AND PHYSICAL CONDITION IN KOETOWINANGOEN (JAVA), by J. J. Ochse, G. J. A. Terra, W. F. Donath and C. D. de Langen; 1934. Buitenzorg (Java), Archipel Drukkerij. Super royal 8vo., pp. 434.

CANCER: IS IT PREVENTABLE? by W. Brown Thomson, M.D., D.P.H.; 1932. London: Chatto and Windus. Large crown 8vo., pp. 303. Price: 10s. 6d. net.

PSYCHOLOGY AND HEALTH, by H. Banister, M.Sc., Ph.D.; 1935. Cambridge: The University Press. Crown 8vo., pp. 256. Price: 7s. 6d. net.

THREE PHILOSOPHERS (Lavoisier, Priestley and Cavendish), by W. R. Aykroyd; 1935. London: William Heinemann (Medical Books) Limited. Demy 8vo., pp. 227. Price: 10s. 6d. net.

SYNOPSIS OF OBSTETRICS AND GYNÆCOLOGY, by Aleck W. Bourne, M.A., M.B., B.Ch. (Cambridge), F.R.C.S. (England); Sixth Edition, fully revised, with numerous diagrams; 1935. Bristol: John Wright and Sons, Limited; London: Simpkin Marshall, Limited; Toronto: The Macmillan Company of Canada, Limited. Crown 8vo., pp. 444. Price: 15s. net.

RESPIRATION, by J. S. Haldane, C.M., M.D., F.R.S., and J. G. Priestley, M.C., D.M., M.A.; New Edition; 1935. Oxford: The Clarendon Press. Medium 8vo., pp. 493. Price: 30s. net.

FRENCH MEDICINE, by M. Laignel-Lavastine and M. Raymond Molinery; 1934. New York: Paul B. Hoeber. Foolscap 8vo., pp. 187, with illustrations. Price: $2.50.

LECTURES FOR NURSES, by G. N. Burbidge, S.R.N.; 1935. Sydney: The Australasian Medical Publishing Company, Limited. Crown 8vo., pp. 327. Price: 7s. 6d.

Diary for the Month.

MAY 14.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
MAY 14.—Tasmanian Branch, B.M.A.: Branch.
MAY 15.—Western Australian Branch, B.M.A.: Branch.
MAY 15.—Victorian Branch, B.M.A.: Clinical Meeting.
MAY 21.—New South Wales Branch, B.M.A.: Ethics Committee.
MAY 21.—Tasmanian Branch, B.M.A.: Council.
MAY 22.—Victorian Branch, B.M.A.: Council.
MAY 23.—New South Wales Branch, B.M.A.: Clinical Meeting.
MAY 24.—Queensland Branch, B.M.A.: Council.
MAY 28.—New South Wales Branch, B.M.A.: Medical Politics Committee.
MAY 30.—South Australian Branch, B.M.A.: Branch.
MAY 30.—New South Wales Branch, B.M.A.: Branch.
MAY 31.—Queensland Branch, B.M.A.: Bancroft Memorial Lecture.
JUNE 4.—Tasmanian Branch, B.M.A.: Council.
JUNE 5.—Western Australian Branch, B.M.A.: Council.
JUNE 5.—Victorian Branch, B.M.A.: Branch.
JUNE 6.—South Australian Branch, B.M.A.: Council.
JUNE 11.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
JUNE 11.—Tasmanian Branch, B.M.A.: Branch.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", pages xvi-xviii.

CANTERBURY DISTRICT MEMORIAL HOSPITAL, CAMPSIE, NEW SOUTH WALES: Medical Superintendent.

CHILDREN'S HOSPITAL (INCORPORATED), PERTH, WESTERN AUSTRALIA: Junior Resident Medical Officer.

HOBART PUBLIC HOSPITAL, HOBART, TASMANIA: Deputy Superintendent.

LAUNCESTON PUBLIC HOSPITAL, LAUNCESTON, TASMANIA: Resident Medical Officer.

ROYAL AUSTRALIAN AIR FORCE: Medical Officer.

ROYAL HOSPITAL FOR WOMEN, SYDNEY, NEW SOUTH WALES: Resident Medical Officer, Junior Resident Medical Officer.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associate Friendly Societies' Medical Institute. Chillagoe Hospital. Members accepting LODGE appointment and those desiring to accept appointments to any COUNTRY HOSPITAL, are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	Officer of Health, District Council of Elliston. All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

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